June 14, 1948

JUN 1

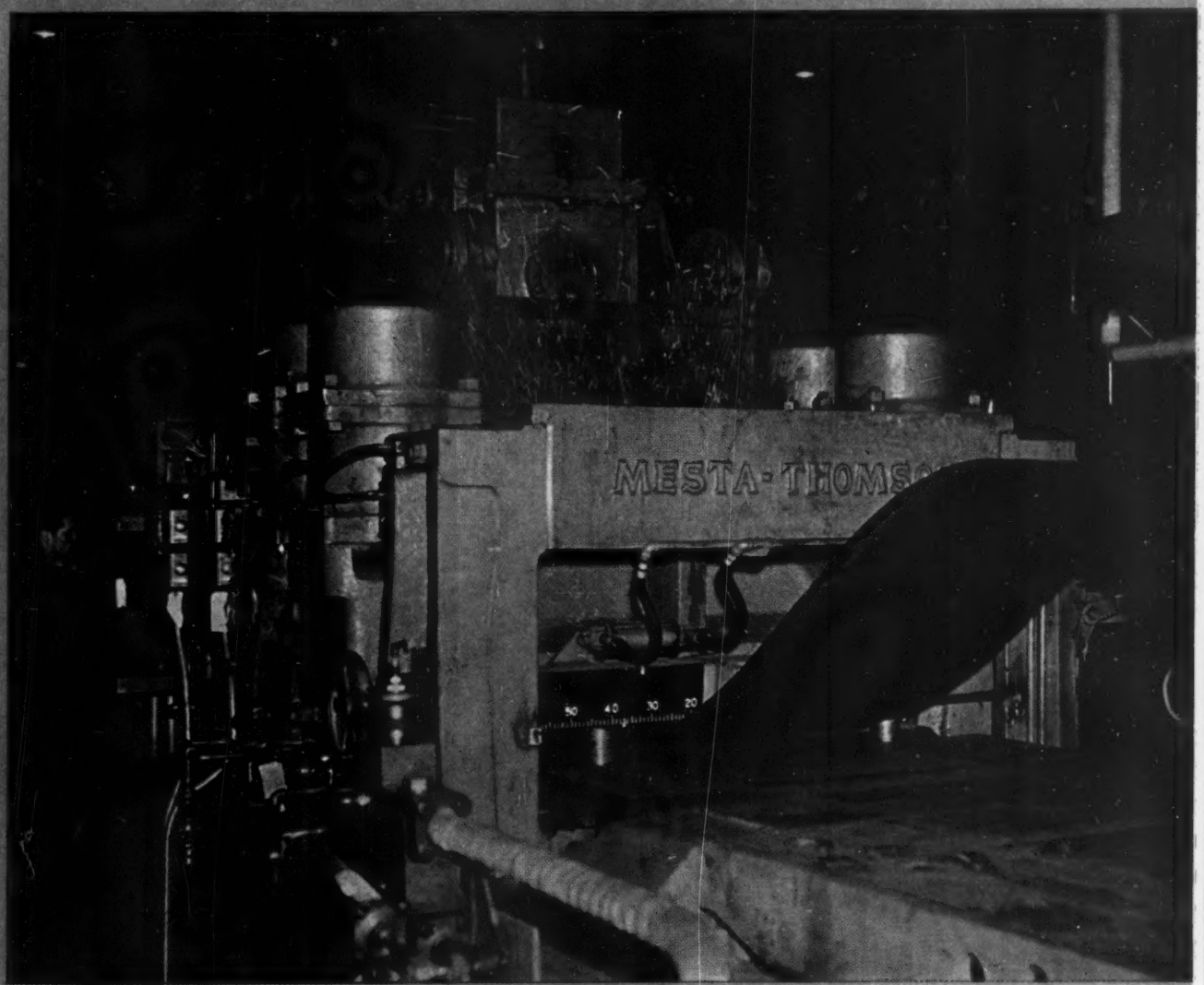
STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 51

Increase Cold Mill Production with
MESTA-THOMSON Flash Welders



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42" Mesta-Thomson Flash Welder in a
Mesta High-Speed Continuous Pickling Line installed at
Jones & Laughlin Steel Corporation, Aliquippa Works.

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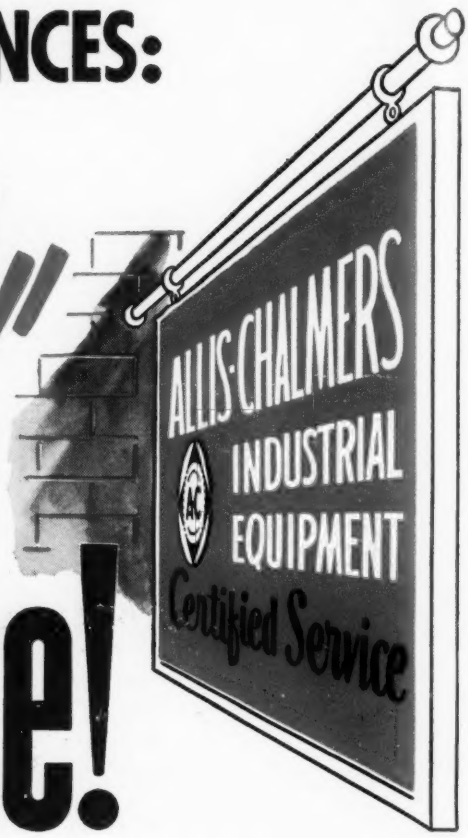

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VOL 122, NO. 24 JUNE 14, 1948

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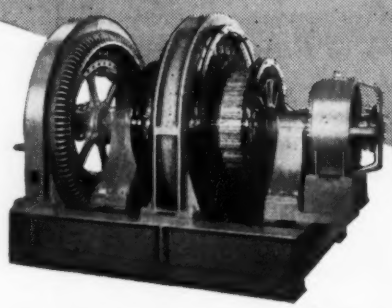

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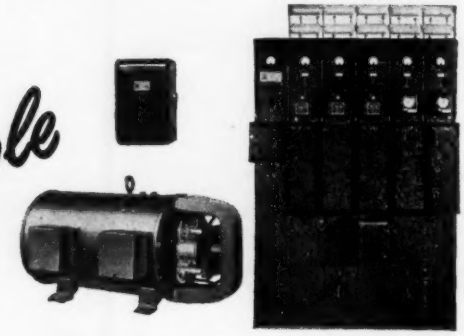

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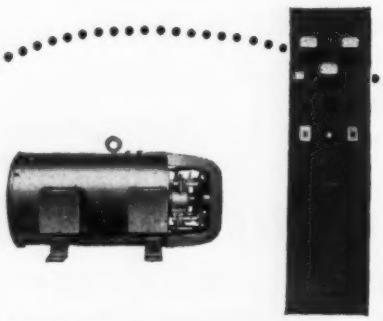

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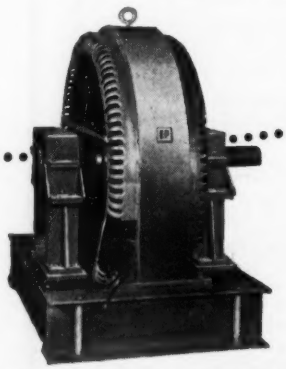

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June 14, 1948

Confusing Testimony

After the Supreme Court ruled in the cement and glucose cases, Sen. Homer E. Capehart introduced a resolution (S-241) calling for an investigation of the impact of these decisions upon consumers, large and small business and the economy generally. A Senate subcommittee, formed to inquire into this subject, held hearings at which violently conflicting testimony was presented. Subsequent events indicate that Senator Capehart's interest in clarifying the meaning of the decisions may lead to a sweeping investigation of the entire problem of antitrust laws and competition.

Pending further developments, industrialists may well consider the divergent viewpoints expressed by members of the Federal Trade Commission at these hearings. Commissioners Freer, Davis, Ferguson and Ayres seemed disposed to soft-pedal the significance of recent Supreme Court decisions. Commissioner Freer insisted that "it should be made clear that the cement ruling does not have the radical and revolutionary effect that has been attributed to it in some quarters." He and his three associates gave the impression that industry still has wide latitude in the choice of pricing practices that are legal. Nevertheless, they claimed FTC cannot write a formula defining what is legal or illegal under present laws. They insist that every situation must be considered on its own merits.

Commissioner Lowell B. Mason contended that the Supreme Court decisions have created widespread confusion. He also made this arresting statement: "We don't have to find people guilty of violating any law in order to slap a cease and desist order against them. The present legislative and administrative trend is away from the Anglo-Saxon theory that recognizes the innocence of a citizen until he is proven guilty. We are adopting the European Napoleonic code which places the burden upon a citizen to prove his innocence once FTC accuses him in a complaint. Under present procedures . . . it is safe to say we can take orders against 100,000 businessmen."

It is confusing, to put it mildly, when four commissioners declare the Supreme Court rulings will not affect industry drastically, while the fifth contends that the decisions automatically make 100,000 businessmen potentially guilty. This confusion alone is enough to justify pushing the Capehart investigations to a conclusion that will bring clarification to industry.

* * *

LESSER OF TWO EVILS: Senator Kenneth S. Wherry, chairman of the Senate Small Business Committee, has been hounding steel producers for more steel for small consumers. Last week they gave him an answer. They said that small users who experience hardship in obtaining steel need a champion ranking with the armed services, Atomic Energy Commission, Economic Co-operation Administration and other favored claimants. They pointed out that there is no method at present by which steel sellers acting in concert can ease hardship cases.

Of course this answer is unsatisfactory to unfortunate consumers, yet it is difficult to see how producers could have answered differently. When acting as a group they are prohibited by law from acting to ease hardship cases.

However, there is nothing to prevent individual producers from striving to channel steel to hard pressed buyers. In a few instances suppliers who had withdrawn from certain consuming areas have reversed their practice and now are again supplying customers who had been cut off previously. The possibility of distributing more steel through warehouses still offers a ray of hope. As time goes on, the urge

(OVER)

among sellers to line up regular customers for the competitive period ahead should work in favor of some buyers who now are spurned.

These possibilities are a poor substitute for actual shipments of steel, yet they would be infinitely preferable to mandatory allocations.

—p. 62

* * *

WORKING FUNDS SHRINK: Securities & Exchange Commission estimates that net working capital of United States corporations as of Dec. 31, 1947 was at the record level of $61.8 billion, an increase of $5.3 billion during the year. The increase resulted from a rise in current assets of $12.4 billion and an offsetting increase in current liabilities of $7.1 billion.

At first glance this appreciable gain in net working funds appears to be highly gratifying. However, closer examination of the commission's figures reveals that the chief factor entering into the gain was an increase of $6.3 billion in inventories, which brought the total up to $42 billion. Obviously this substantial increase is due largely to higher prices.

Under today's conditions a more reliable index of working capital would be quick assets to current liabilities or, even better, the ratio of cash and government securities to sales. American industrial corporations in 1947 lost ground according to both of these yardsticks. On the basis of liquidity, industry's position as to working capital is not as comfortable as is indicated by superficial figures. —p. 66

* * *

FAIRS REFLECT UPTURN: Reports from abroad indicate that current industrial fairs are meeting with noteworthy success. At the recent Brussels show, the exhibits of 3700 companies reflected Belgium's increasing ability to compete in world markets. The number of exhibitors exceeded that of last year's show by 400, space occupied by exhibits was larger and the range of products shown was broader.

The fair at Paris far exceeded prewar expositions in size and scope. Exhibitors numbered 9200 and their exhibits covered 125 acres. Attendance was estimated in excess of the 2,250,000 who witnessed last year's show. About 1100 exhibitors participated in the Engineering & Hardware section of the British Industries Fair at Birmingham, Eng., which was devoted exclusively to products of the metalworking industries.

The magnitude of these three fairs and the apparent widespread interest manifested in them indicate that the underlying forces for recovery in some sectors of Western Europe and Britain may be stronger than has been realized.

—p. 70

* * *

GOOD BUSINESS AHEAD: American machine tool builders are in the enviable position of knowing that a sizable volume of business is due to come their way. The deconcerting factor is that they do not know exactly when it will arrive.

Several conferences between representatives of the armed services and machine builders have brought out the likelihood that the preparedness program may require the purchase of more than 250,000 units over the next five years. This business would be in addition to the $122 million worth of machine tools expected to be purchased under the European Recovery Program.

Some months may pass before orders resulting from these two projects begin to be received by builders. However, the expected volume will be sufficient to return the machine tool industry to virtually a wartime footing. The prospect should guarantee that 1949 will be a good year for the industry. —p. 65

* * *

PRACTICAL HYGIENICS: Bethlehem Steel Co. has installed a new industrial hygiene laboratory to seek out and eliminate industrial hazards and to provide improved working conditions for employees in its plants.

Most important among the functions of the laboratory is the control of atmospheric contaminants, which include dusts, fumes, smoke, mists, vapors and gases. Other environmental problems of importance are proper heating or cooling, ventilation, illumination, noise abatement and protection against radiant energy.

Three distinct phases are involved in the work of the industrial hygiene staff: (1) study of conditions and collection of samples, (2) analytical work in the laboratory and (3) determination of control and corrective measures.

The new laboratory and the industrial hygiene program afford a scientific approach to the solution of an important problem to which many companies have devoted either haphazard or inadequate attention. Bethlehem's example could be followed with profit by many companies in the metalworking industries. —p. 110

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

PRICING METHODS— Congressional investigation into the effects of recent court decisions on industrial pricing methods now promises to bloom into an overall study of the effects of economic concentration on competition—possibly reminiscent of the prewar TNEC investigations (p.59). Original aim of the study now being organized was to seek clarification as to which pricing methods are legal and which are illegal. More than 100,000 business enterprises are threatened with disruption of their pricing methods by the Cement and other court decisions.

ALLOCATIONS— Antitrust laws, designed to protect small business, in some cases are having just the opposite effect. Steel producers last week told a Senate subcommittee that they know of no legal way in which they can act in concert to assure a more equitable distribution of steel to small users and to alleviate hardship cases (p. 62). The problem is being tackled by the Office of Industry Co-operation, which is working on a spot assistance program.

STEEL EXPANSION—Military planners are not going to insist on any large steel expansion, such as proposed by some government economists, at this time (p. 66). At a conference between industry representatives and the Munitions Board, it was agreed that present capacity is adequate to provide essential steel needs, if nonessential uses are curbed. Recognition was given to the fact that raw material supplies would be inadequate to support a larger capacity and also that large quantities of critically needed steel would be required to build new facilities.

AUTO PRICES— Advertised prices for passenger cars have advanced from 42 to 118 per cent since 1941, with an unweighted average increase of 72.2 per cent (p.74). These figures do not take into account accessories and extra equipment which have advanced sharply and which may add from $200 to $500 to the delivered price to the buyer. The wide range in price increases for the various makes can be at least partially explained by changes in design and size.

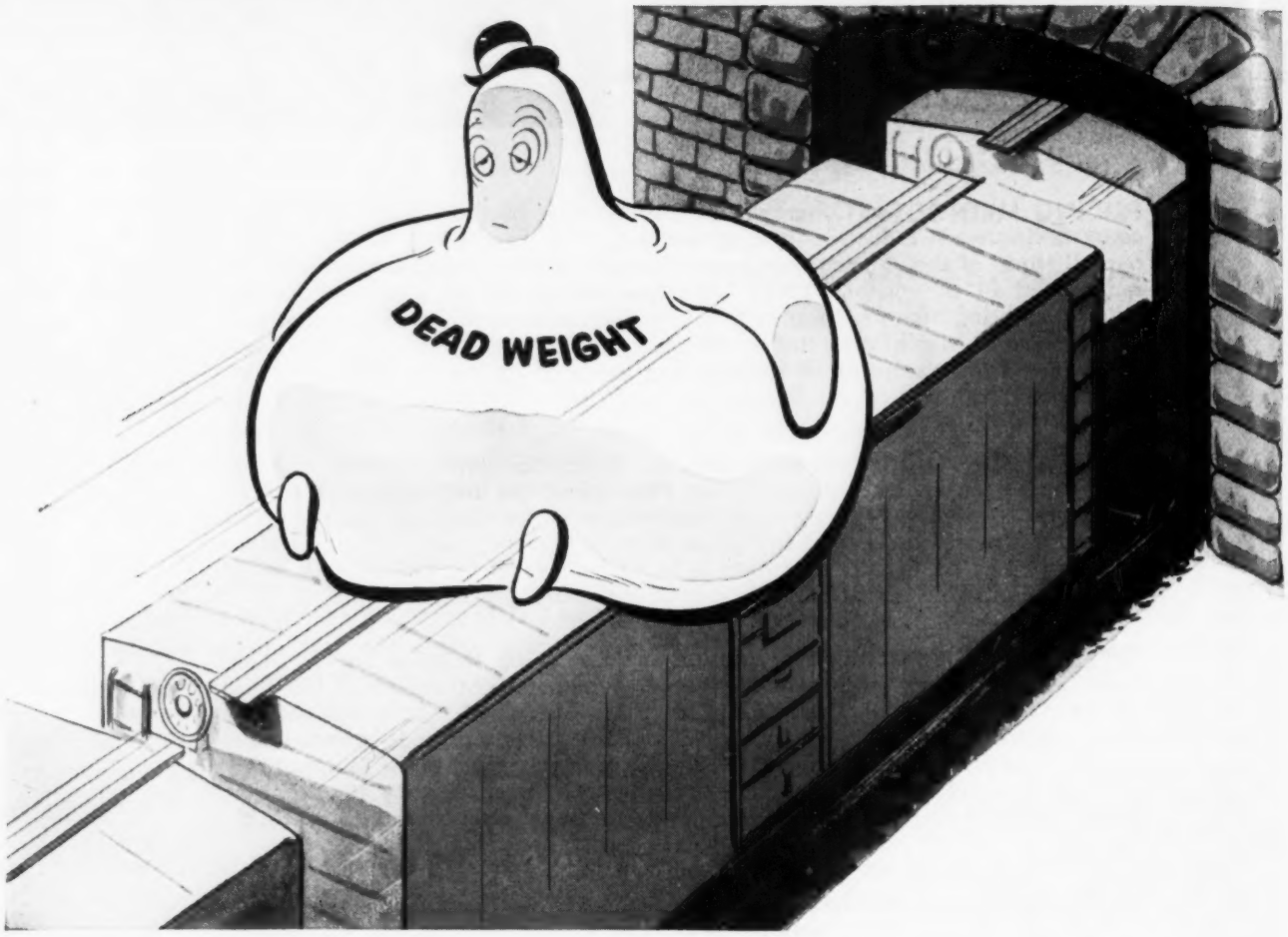
MACHINERY—If orders for machine tools required to expand the armed services to envisioned strength should be placed, the industry would experience a boom comparable to wartime (p. 65), according to some builders. Service representatives talk of the purchase of 250,000 units over the next five years. Such a procurement program would mean a 100 per cent increase over the 1947 level.

EXPORTS— Iron and steel shipments abroad during the first quarter were 16 per cent below the quarterly average for 1947 (p. 71). Exports of semifinished material are at half the 1947 level; track material shipments are substantially lower. Pipe and tubing volume is heavier.

FOREIGN—Extent of Europe's postwar recovery is being evidenced at industrial fairs (p. 70), which are occupying more space and attracting more exhibitors than last year. Increasing emphasis is being placed on production for export.

SIGNS OF THE TIMES— Republic Steel Corp. this week will start operating its new pipe mill at Gadsden, Ala. (p. 76). Capacity of the new mill is 10,000 to 12,000 tons of 24 to 30-inch line pipe monthly . . .Hitching of the General Motors wage scale to the Bureau of Labor Statistics cost-of-living index is greeted with mingled emotion—elation and nervousness—at the Department of Labor (p. 66). BLS officials are elated at the recognition given the index but are somewhat apprehensive of its responsibility. . . Industry is studying the implication of last week's Supreme Court decision awarding longshoremen extra overtime pay (p. 65). Some fear the ruling sanctions overtime-on-overtime; others believe the decision will have few repercussions outside the shipping industry . . . United States Steel Corp. is expected to take title to the assets of Consolidated Steel Corp. this autumn, following the Supreme Court's refusal (p. 65) to block the sale. . . Costs of raw materials used by the steel industry (p. 69) have advanced from 15 to 461 per cent since the base period of 1936-39.

Engineering News, P. 87 *Market Summary, P. 143*



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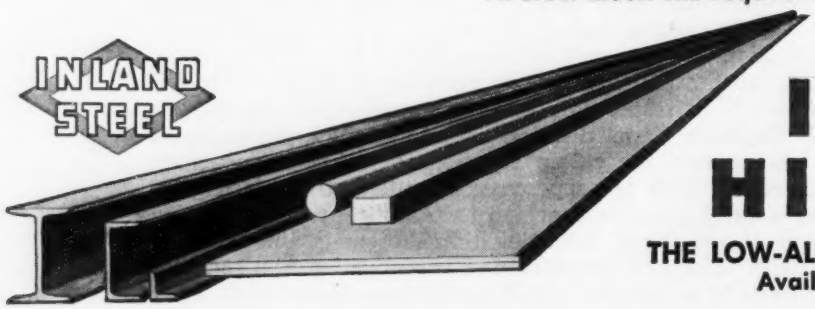

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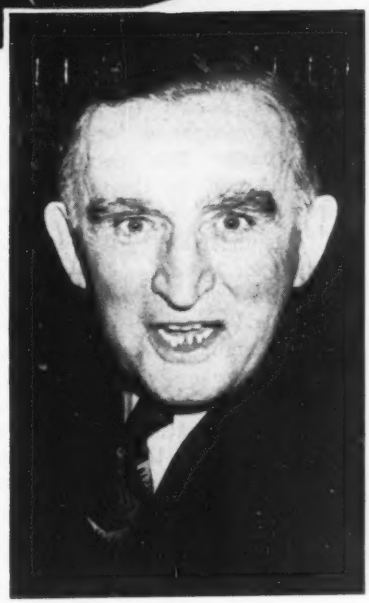


SEN. JOSEPH C. O'MAHONEY

Senate Group Enlarges Scope of Economic Probe

What started out as investigation of effect of Supreme Court basing point pricing decisions appears developing into full-blown study of monopoly control and trust law enforcement

WHAT started out as a projected probe into the effect on the national economy of recent Supreme Court decisions in antimonopoly cases, last week gave promise of developing into a full-blown investigation by the Senate to determine whether a concentration of economic power in this country threatens competition.

A Senate subcommittee, originally set up at the instigation of Sen. Homer E. Capehart (Rep., Ind.) to inquire into Supreme Court decisions affecting basing point pricing and kindred matters, approved a resolution calling for an inquiry into problems growing out of increasing economic concentration. The parent committee, the Senate Interstate & Foreign Commerce Committee, later reported favorably the Capehart committee resolution, as amended.

Enlargement of the probe subject was voted following testimony by Sen. Joseph C. O'Mahoney (Dem., Wyo.) and Federal Trade Commission officials.

The Capehart subcommittee resolution calls for a check on the extent, character and effects of economic concentration on competitive business and antitrust law enforcement. It also provides for inquiry into existing laws and administration that may hinder competition in business; growth of monopolistic practices; and development of small and independent business.

Senator Capehart's original resolution, S241, called for an investigation of the impact of Supreme Court antimonopoly and antidiscrimination decisions on consumers, large and small business, and on the economy generally. The resolution was sparked by the serious implications for business in the Court's interpretation of the laws in the Cement and Glucose cases.

Businessmen Confused — The evidence developed in preliminary hearings of the Capehart subcommittee confirmed the senator's opinion that businessmen in all industries and throughout the country are unable to get satisfactory answers to the question as to what pricing methods are legal, and what methods are illegal. This uncertainty, Senator Capehart felt, must be removed.

The preliminary hearings, in which five members of the Federal Trade Commission were questioned, brought out a deep cleavage of opinion in that body. Four commissioners, Freer, Davis, Ferguson and Ayres (STEEL, June 7, p. 65) told the sub-

committee there is no way of writing a formula as to what is legal or illegal, and that the verdict depends on the special circumstances and conditions prevailing in each industry and with each company.

In their opinion, the only logical and acceptable procedure is for the FTC to continue its investigations of individual industries or companies as at present and, when it uncovers something wrong, issue cease and desist orders.

"The commission," said FTC Chairman Robert E. Freer, "has no desire to suggest how prices should be quoted in any industry or to advise or participate in any decisions of business management."

Provides Fireworks—The commission's lone dissenter, Lowell B. Mason, provided real fireworks when he declared that businessmen and many of their lawyers do not understand the implications of the Supreme Court's decisions. He pointed out that one of the respondents in the Cement case has gone so far as to petition the Supreme Court for guidance as to what it may or may not do. (The Supreme Court, without comment, on June 7 denied the application of cement companies for a rehearing of the case. The decision recently handed down by the Court, therefore, now is final).

This uncertainty, according to Commissioner Mason, of itself is a serious challenge "to our present system of enunciation of law by litigation."

The commissioner drew a frightening picture of what the law, as interpreted by the Supreme Court decisions, threatens for American industry, and he thought an investigation such as suggested by Senator Capehart was an essential preliminary to bringing some order out of the existing chaos.

Commissioner Mason predicated his opinion on a synthesis of the orders and the majority opinions in recently decided cases. These include the Glucose cases, and Crepe Paper decision, the Cement case, the Morton Salt case and the Rigid Steel Conduit case.

Basing Point System Out—He declared that, bearing all of these cases in mind, he felt certain that the multiple basing point pricing system which does not take into account every point of production is out as a matter of law. In some instances, he said, it is out as a matter of plain economics. However, he felt most businessmen would welcome a mill base at every point of production and cited a number of instances wherein several individual steel companies within the recent past have changed their pricing practice.

Freight absorption, in Mason's opinion, is out, since he felt it would be a violation of the law merchant for anyone to use a systematic pricing system which allows him to pay the freight out of his own pocket in order to sell in a competitor's territory.

Freight Absorption Out—The commissioner expressed the opinion that freight absorption is out from pins and needles on up, since he knows of no accepted doctrine in this country which applies the law to one commodity and not to others.

Zone prices also are out, he said, since by their very nature they entail price discriminations which, when inaugurated through systematic pricing, create a situation banned by these decisions of the Supreme Court.

In Commissioner Mason's opinion anyone who uses freight absorption, zone prices or an individual universal delivered price system operates under the shadow of illegality and certainly is taking a calculated risk. This shadow, he said, falls specifically on the following industries:

Industry	Number of companies
Manufacturing	82,198
Food and kindred products	9,039
Beverages	2,772
Tobacco manufactures	219
Cotton manufactures	832
Textile mill products, except cotton	3,678
Apparel and products from fabrics	7,797
Leather and products	2,108
Rubber products	475
Lumber and timber basic products	2,436
Furniture and finished lumber products	3,999
Paper and allied products	2,126
Printing and publishing industries	10,337
Chemicals and allied products	6,476
Petroleum and coal products	482
Stone, clay, and glass products	2,875
Iron, steel, and products	6,719
Nonferrous metals and products	2,519
Electrical machinery and equipment	1,943
Machinery, except transportation equipment and electrical	6,387
Automobiles and equipment, except electrical	646
Transportation equipment, except automobiles	1,157
Other manufacturing	4,119
All other manufactures	3,050

In addition, he said, there are 36,763 companies in the wholesale trade. Most would be subject to the Supreme Court's decisions, and many of them undoubtedly are operating at variance with these decisions. In the retail trade there are 72,955 companies, he said, and while many of these companies come under the Federal Trade Commission's jurisdiction, their marketing habits will not be affected by these Court decisions except as they shall be benefited by a cheaper or burdened by a higher cost for the merchandise they sell.

Discussing the impact of the Court decisions on small and large business, Commissioner Mason said it is reasonable to say that 118,952 business enterprises will be concerned. Most of them, he declared, follow the pricing habits condemned by the Court decisions so "I would say we could make these folks really sweat blood before they got out of our clutches if we sued them, and I am convinced that we would be able to base most of our orders on enough evidence so that reviewing courts wouldn't upset our decision. First, we don't have to find people guilty of violating any law in order to slap a cease and desist order against them; second, the present legislative and administrative trend is away from the Anglo-Saxon theory that recognizes the innocence of a citizen until proven guilty. We are adopting the European Napoleonic Code which places the burden upon a citizen to prove his innocence once the Federal Trade Commission accuses him in a complaint. So under our present procedures and these present decisions it is safe to say we can take orders against 100,000 businessmen."

Willing To Co-operate—In his statement to the subcommittee Commissioner Freer took the position that the FTC is willing to co-operate in examining the theories involved in the Cement case on the applicability of such theories to any other industry, but he insisted that it should be made plain that the Cement case does not have the radical and revolutionary effect that has been attributed to it in some quarters.

"Certainly, it is unwarranted to assume that the effect of this decision is to outlaw all delivered prices or to require only f.o.b. mill prices," he said. "The Cement case is simply a reaffirmation of a principle which is

CEASE AND DESIST

Two more cease and desist orders were issued last week by the Federal Trade Commission. One, applying to five tile manufacturers, their regional sales agency and Structural Clay Products Inc., a trade association, bans combination and conspiracy to fix prices and restrain competition in the sale of glazed facing tile. Among the practices barred is use of a zoning method of formulating delivered prices.

In the second instance, the FTC served a cease and desist order on nine New England brick manufacturers, their sales agency and the trade association of the clay products industry. In this case also a zoning method for computing delivered prices is among practices banned.

a fundamental one in the law and economics of this country that collusion and combination and conspiracy to fix and maintain prices is contrary to American free enterprise.

"The FTC has always stood for preservation of the competitive system and has been directed by Congress to prevent unfair practices which interfere with the system.

Direct Contradiction — "The difficulty with suggesting an amendment to the existing law which would permit practices prohibited by the commission's order in the Cement case is that any such legislation would necessarily be a direct contradiction of the fundamental principles of the antitrust laws. I say this because there is nothing in the commission's order in the Cement case which prohibits conduct on the part of any seller of cement which is not a part of a combination or understanding to eliminate competition, or which is not practiced systematically by the industry for the purpose or with the effect of eliminating competition in the price between sellers."

Commissioner Freer told the committee that if combinations in restraint of trade or systematic price discriminations are to be legalized for the purpose of eliminating competition, then the government must be accorded a voice in the regulation of such combinations and collusive arrangements to protect the public interest. He said that his 30 years' experience in legal matters has convinced him that it is undesirable to substitute for our present antimonopoly laws, under which government's duty is only to keep competition free and fair, a system of regulation of business under which it becomes the government's duty to see that industrial prices and practices are kept reasonable in the public interest.

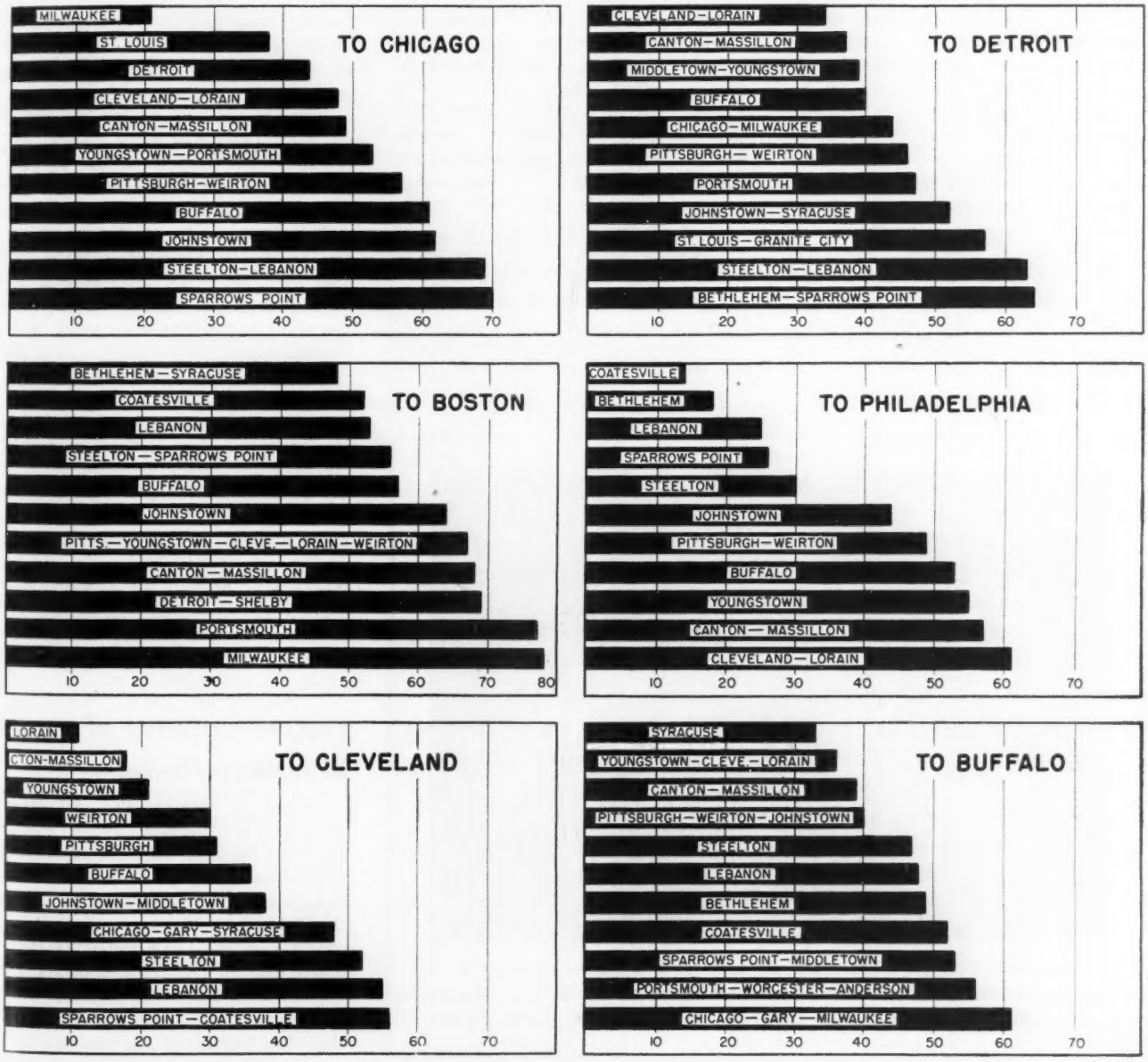
Not Advisable—"There is nothing in our history of public utility regulation," he said, "either by state or federal government, which would lead me to suppose that any such regulation would be advisable in such industries as steel, cement, etc."

The hearing was not without some senatorial support for the FTC majority. Senator Brien McMahon (Dem., Conn.) thought that the antimonopoly laws are easily understandable and the trouble comes from attempts at evasion. "The thing to do is put some teeth in the law; provide some jail penalties," he said.

Senator O'Mahoney took advantage of the hearings to issue a statement recalling some of his antimonopoly tirades of TNEC days.

TYPICAL RAIL FREIGHT RATES ON STEEL TO LEADING INDUSTRIAL AREAS

(Cents per 100 lbs)



"Hardship" Cases Knotty

Steel producers tell Senate committee antitrust laws prohibit them from taking concerted action to improve maldistribution problems, ease position of small user

SMALL steel users who are experiencing hardships in obtaining steel need a champion ranking on par with the armed services, the Atomic Energy Commission, Economic Co-operation Administration and other steel claimants. Unless and until such a setup is created there is no way in which steel producers acting in concert can take care of hardship cases.

This was the reply of steel industry representatives to the request of Sen. Kenneth S. Wherry, chairman of the Senate Small Business Committee, to evolve a plan for more equitable distribution of steel to small users and to remote areas. They reported back to the committee June 8.

The steel men pointed out that it would be illegal for them to act as a group in taking care of hardship cases among steel consumers. They are granted immunity from the antitrust laws only in carrying out the allocations agreements under Public Law 395 covering government-authenticated and sponsored programs.

Maldistribution Cure Sought — The steel industry representatives, mostly members of the Steel Products and Steel Producers Industry Advisory Committees and headed by David F. Austin, vice president of United States Steel Corp., had been told by Senator Wherry that industry should solve its own problems of maldistribution.

"I do not ask you to violate the antitrust laws," he said, "but if you evolve a plan for taking care of these hardship cases, bring it in and we will have the attorney general over and discuss it. I am convinced that a method will be found for doing this job legally."

Senator Wherry now has placed the problem in the hands of John C. Virden, director of the Office of Industry Co-operation. He asked Mr. Virden and the steel representatives to continue to study the problem and report back to him when they had agreed upon a course of action.

Mr. Virden reported that OIC has been working on a spot assistance program since January and disputed a statement by Senator Wherry that the hardship situation is getting worse. Mr. Virden complimented the steel representatives for their co-operation, saying they had acted favorably on every request made and that he believed ways to relieve hardship cases could be worked out.

Warehouse Receipts Fair — Senator Wherry said he was informed that many western warehouses are receiving only 30 to 40 per cent of the steel tonnage they received last year before their old mill sources cut them off as result of increased freight rates. The effect, he said, has been disastrous to many western consumers who have had to buy as high as 80 per cent of their steel requirements in the gray market.

Walter S. Doxsey, president, American Steel Warehouse Association, was called from among spectators to testify as to steel shipments to warehouses all over the country.

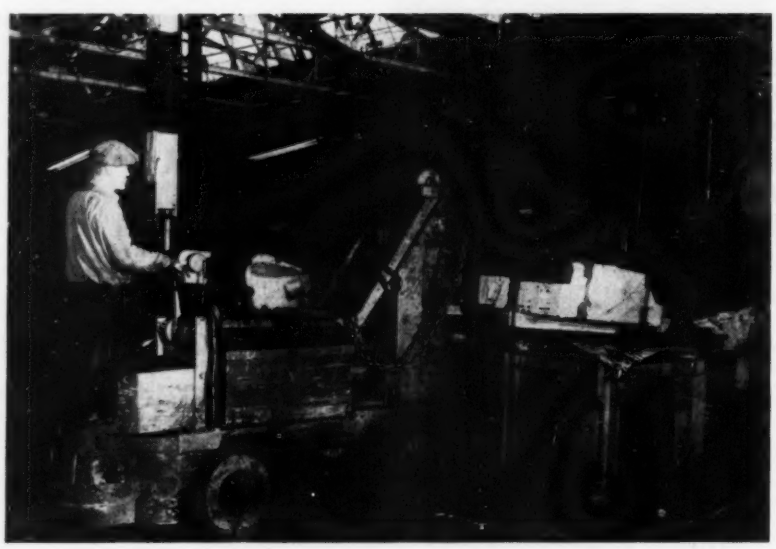
"The 2000 warehouses serving industry, plus those handling merchant products, received 10,400,000 tons of steel in 1947, which was about 1,100,000 tons more than they received in 1946," said Mr. Doxsey. "This amounted to 17 per cent of total production of steel for the year."

Considering the steel shortage, the warehouse association executive felt that most members of the warehouse industry were of the opinion the steel industry's distribution performance gives them little grounds for reasonable complaint.

Fight Gray Market — Steel spokesmen explained that they are taking all possible steps to kill off the steel gray market. Customers who resell at unwarranted premiums are being cut off. Details of gray market operations have been reported by producers to the Federal Bureau of Investigation.

George Meredith, staff director for the Wherry committee, pointed out that the FBI is not interested in investigating the gray market inasmuch as it involves no infraction of federal laws.

Senator Wherry at one point in the conference asked Paul Mackall, vice president, Bethlehem Steel Co., to "promise" that Bethlehem would continue its policy of staying with old customers. He withdrew his request after Mr. Mackall said he would make no promise of where Bethlehem would sell steel. His company, he pointed out, follows the policy of loyalty to its customers but must retain its freedom to review its distribution problems as they arise.



PACKAGED SHEET METAL: Electric fork truck transports 10,000 lb of packaged sheets to rack alongside press which produces rear housing cover for Chevrolet trucks at Chevrolet Gear & Axle plant, Detroit

Explore Legality of Allocation Powers

Extent to which the voluntary agreements program under Public Law 395 may be used for allocating scarce materials for national defense and foreign aid programs, including the ECA, is being explored by legal officials of the Department of Commerce and the Department of Justice.

John F. Baecher, acting assistant attorney general, has advised the OIC that the voluntary agreements pro-

gram to provide assistance for stockpiling scarce and critical materials under the Strategic and Critical Materials Stockpiling Act is legal under Public Law 395.

The Department of Justice has also agreed that voluntary agreements can be put into operation for allocating scarce commodities for the benefit of municipalities to meet critical situations affecting health and safety.

Distributors Suggest Expansion of Program

Suggestions for an expanded voluntary allocations program have been made to the Office of Industry Co-operation by Association of Steel Distributors, New York, through Morris Rosoff, general counsel. The program contemplates: (1) Setting up another category for allocations to supply the steel needs of small business; (2) replenishment of distributors' stock by the mills; (3) increased mill allocations to distributors to enable them to honor orders from priority holders.

Two warehouse industry advisory committees, one for merchant products and one for general line products, are to be appointed soon.

Pig Iron Allocation For Housing Approved

Approval of a program providing 110,000 to 128,000 tons of pig iron monthly for the manufacture of cast iron products for residential housing has been given by the Pig Iron Industry Advisory Committee. Exact amount of the monthly tonnage will be worked out by the Pig Iron Task Committee with the Office of Industry Co-operation.

Request for Steel for Prefab Housing Revived

Request for 58,000 tons of sheets for prefabricated housing will be revised at a meeting of the steel products task committee and the Office of Industry Co-operation in Washington June 22.

Additional steel allocations to be requested include: 250,000 tons for inland waterway oil barges; an indefinite amount, which may be as much as 350,000 tons, for tankers.

Funds Approved for 2201 Planes for Air Force

The $1,345,165,000 approved by the Secretary of Defense for procurement of aircraft by the U. S. Air Force will permit the awarding of contracts to aircraft manufacturers for 243 bombers, 1405 fighters and 553 transport, training, and air sea rescue aircraft, the Air Force announced last week.

These 2201 planes would be built by nine companies, with most of the craft expected to be delivered during fiscal 1950.

International Harvester Increases Tractor Prices

International Harvester Co., Chicago, which early last year sought to fight inflation by reducing its prices, has announced increases.

The company announces that upward adjustments on wheel-type farm tractors were made necessary by constantly rising costs of materials and other factors in production. Amount of the increase was based upon actual cost increases already sustained, the company said, and not upon anticipated future increased costs. The new prices, effective June 3, range from 2.5 to 14.8 per cent higher, but average less than 10 per cent on the company's entire farm tractor line.

When cuts aggregating $20 million a year were made by Harvester last March, the company said its decision was predicated on the hope that it could continue to buy its materials at unchanged or lower prices.

U. S. Steel's Expansion Shown in New Movie

United States Steel Corp.'s newest motion picture, "Unfinished Business," has been released for public showing. The film which weaves in the return of a young steel worker from the job of defending America to the business of building it is the story of the multimillion dollar construction and modernization program undertaken since V-J Day.

One of the initial showings of the picture was sponsored by American Steel & Wire Co., a U. S. Steel Corp. subsidiary, last week at a luncheon in Cleveland for press and radio representatives and U. S. Steel subsidiaries' officials.

Present, Past and Pending

■ CARBORUNDUM CO. TO BUILD NEW PLANT
VANCOUVER, WASH.—Carborundum Corp., Niagara Falls, N. Y., has awarded a $2½ million contract to Blaw-Knox Co., Pittsburgh, for construction at Vancouver of a silicon carbide furnace plant.

■ STEEL EXPORTS SET NEW PEACETIME RECORD
NEW YORK—Exports of 6,543,085 tons of finished steel from the United States in 1947 set a new peacetime record.

■ ELECTRIC STORAGE BATTERY CO. BUYS PLANT
PHILADELPHIA—Electric Storage Battery Co. has purchased the Fairfield, Conn., plant of Aluminum Co. of America for use in making lead plates and assembling motor vehicle batteries for shipment throughout New England.

■ ANTI-RED CONTROVERSY GOES INTO COURT
CHICAGO—United Steelworkers of America is carrying its anti-Communistic affidavit certification controversy into the courts here by petitioning the Seventh Circuit Court of Appeals to review a National Labor Relations Board decision upholding Inland Steel Co.

■ WAGE AND SALARY PAYMENTS DECLINE
WASHINGTON—Wage and salary payments declined in April for the third consecutive month and reached the lowest level since last November. The decline centered in manufacturing and resulted in part from labor disputes and materials shortages which curtailed hours worked.

■ GETS EQUIPMENT ORDERS FROM ARGENTINA
PHILADELPHIA—Catalytic Construction Co., subsidiary of Houdry Process Corp., has received contracts to supply petroleum refinery equipment to an Argentine oil firm. Gross value of the materials which it is anticipated will be shipped during the third quarter of this year is $2½ million.

■ PLANS WEST COAST FACTORY SALES BRANCHES
DETROIT—Because of expansion of the California market, the Cadillac division of General Motors Corp. will establish factory sales branches Jan. 1 in Los Angeles, San Francisco, Oakland and Pasadena.

How To Make Better Gears, AGMA Topic

HOT SPRINGS, VA.

HOW to make better gears, and the business and economic problems confronting the industry, occupied the American Gear Manufacturers Association in the thirty-second annual meeting June 6-9 at this mountain resort.

Attendance reached a new record, with 220 members and guests registered. The three morning sessions were about equally divided between technical and business problems.

A highlight of the meeting was the presentation of a paper on "Factors Influencing Quality of Ground Gears and Worms" by L. P. Tarasov, research engineer, Norton Co., Worcester, Mass. Dr. Tarasov pointed out that with improved methods of detecting flaws and minute cracks in gears it is becoming increasingly necessary to identify correctly the origin of such defects so that they can be eliminated at their source.

While bad grinding practices in some cases do cause burns and resulting damage to work, many things which are blamed on grinding actually are due to bad forgings, improper heat treating, machining prior to grinding and careless handling. Dr. Tarasov illustrated his discussion with microphotos made in the Norton laboratories.

Engineering Forum — Many matters relating to engineering and manufacturing were discussed at an engineering forum under the chairmanship of S. L. Crawshaw, Western Gear Works, Seattle. Participating in the forum were A. H. Candee, Gleason Works, Rochester, N. Y.; Paul Manger, Farrel-Birmingham Co., Ansonia, Conn.; L. D. Martin, Eastman Kodak Co., Rochester, N. Y.; R. E. Rawling, Rawling Gear Works, Worcester, Mass.; S. F. Richardz, Westinghouse Electric Corp., Pittsburgh; and C. R. Staub, Michigan Tool Co., Detroit.

One outstanding point emphasized in the discussion was that good gears cannot be made from inferior blanks and that sources of forgings and castings should be thoroughly investigated as to ability to maintain quality.

Navy Helps Research — In a paper on noise problems in marine propulsion gears, George Wohlberg, Naval Engineering Experiment Station, Annapolis, Md., explained the importance of gears in the Naval program and the extent to which the Navy is contributing to improvements in gear design and performance through basic experimental research on mechanisms of large size. These studies of noise and vibration elimination are important not only to national defense but also are paying big dividends in gear improvement throughout American industry. As far as the business side of the gear industry is concerned, it was evident from the tone of the meeting that there is increasing interest in statistical control and manufacturing costs.

Production at High Rate — D. T. MacCartney, statistician of the association, explained the significance of some of the overall industrial trends. By and large, the level of operations in the gear industry continues at a rather high level and indications are that it will so continue for some time to come.

Highlight of the annual banquet Tuesday evening was presentation of the 1948 Connell award to Louis D. Martin, gear engineer, Eastman Kodak Co., for his valuable contributions to knowledge and literature pertaining to fine pitch gearing.

New officers of AGMA for 1948-49 were introduced at the banquet. They are: President, Walter L. Schneider, who is vice president, Falk Corp., Milwaukee; vice president, Fred W. Walker, who is executive vice president, Philadelphia Gear Works; treasurer, Roger B. Salinger, who is president, Massachusetts Gear & Tool Co., Woburn, Mass.

New members of the executive committee are John H. Flagg, president, Watson-Flagg Machine Co.; Paul A. Manger, chief engineer, Farrel-Birmingham, Buffalo Division; S. L. Crawshaw, manager, engineering and sales, Western Gear Works; and Louis Bond, vice president and general manager, Gearing Division, Charles Bond Co. Newbold C. Goin was re-elected executive secretary, with headquarters in the Empire Bldg., Pittsburgh.

SCRAP BALER: A large hydraulic press, capable of baling scrap in bundles weighing up to 1200 pounds and large enough to compress a whole passenger car body, has been installed by the A-1 Iron & Metal Co., South Gate, Calif. The press, which is 16½ feet long and 6 feet wide, was built by the Hydraulic Press & Engineering Co., also of South Gate

Detroit Firm Restrained From Using J. & L. Name

Edwards Industrial Engineering Co., Detroit, has been restrained through a temporary injunction from using the name of Jones & Laughlin Steel Corp., Pittsburgh, in its dealings and also from representing itself as an agent for Jones & Laughlin. The order was signed by Judge Frank Fitzgerald of the Wayne County Circuit Court, Detroit, after a Jones & Laughlin official testified the steel brokerage firm did not represent J. & L.

Tool Builders' Return to War Footing Seen

CLEVELAND

PLACEMENT of orders for the number of machine tools seen required to expand the armed services to envisioned strength would place the machine tool industry virtually on a wartime footing, according to leading builders in this area.

Representatives of the services, particularly the Air Force, in discussing future needs at several meetings with tool men recently talked in terms of purchase of over 250,000 units over the next five years. Such a procurement program would demand a 100 per cent increase in machine tool activity, as measured by 1947 shipments. It would bring the wartime boom back to the industry and undoubtedly would again create many of the wartime materials and components shortages. Builders, generally, could assimilate this business in existing plants.

How Soon?—Such a program, as far as local builders are concerned, is the focus of intense interest and gives rise to considerable speculation as to how quickly it could be brought to fruition. Generally the belief is that any large-scale increase in ordering for military account is at least six months away. Purchasing channels would have to be established and subcontractors' procedures set up to handle this volume. Builders say they probably will not feel the program's effects much before 1949.

Somewhat the same anticipation is expressed with regard to machine tool purchases under the European Recovery Program. It is believed $122 million worth of tools will be required from domestic builders for ERP account, but normal red tape connected with such purchases will probably not be unwound for another three months. Meanwhile, foreign ordering is sparse, import restrictions aimed at conserving dollar reserves constituting the major deterrent.

On the domestic scene, builders and distributors noted little change in sales volume between May and the two preceding months. Compared with last year, however, there has been a moderate improvement. Mobilization programs and possibility that allocations and priorities might return to the industry have promoted some tool buying, but high production rates and growing need to keep costs competitive for many products probably have been more of a bolstering factor to the industry's sales volume than these other considerations.

Court Refuses To Block Consolidated Steel Sale

Attempts by the Department of Justice to block sale of Consolidated Steel Corp. to United States Steel Corp. were thwarted by the Supreme Court in a 5 to 4 decision June 7. The high court upheld a decision of the Delaware district court throwing out a government suit to enjoin Columbia Steel Co., U. S. Steel subsidiary, from purchasing the assets of Consolidated on the ground the purchase would violate the Sherman Act. Following the decision, Alden Roach, president of Consolidated, predicted the sale would be closed on either Aug. 31 or Sept. 30.

Stevedores Win Extra Overtime Pay Suit

United States Supreme Court has ruled that New York longshoremen are entitled to extra pay for working more than 40 hours a week, over and above the time-and-a-half premium pay provided in a collective bargaining agreement.

The court said the time-and-a-half rates in the agreement for work outside certain regularly scheduled working hours did not satisfy the wage-hour law when the longshoremen worked more than the 40-hour minimum. The time-and-a-half, the tribunal stated, was merely a premium for working undesirable hours and was not a premium for working more than the legal minimum.

The decision, while not important to the metalworking industry in itself, opened the possibility that other union workers might attempt to pyramid overtime on overtime and bring suits for recovery of such pay.

The decision may, however, bring congressional action ruling out such overtime claims by law, and may result in rewriting some labor contracts.

Metals Show Slated for Philadelphia Oct. 25-29

American Society for Metals will hold its 30th annual national metal congress and exposition in Philadelphia's Commercial Museum and Convention Hall for five days beginning Oct. 25. W. H. Eisenman, society secretary, is managing director of the exposition.

Meeting simultaneously with the American Society for Metals will be the American Welding Society, the Institute of Metals Division of the American Institute of Mining & Metallurgical Engineers and the Society for Non-Destructive Testing. These groups will conduct technical programs relating to the science of metals.

An estimated 30,000 will attend the exposition.

Calendar of Meetings . . .

June 15, Chamber of Commerce of the United States: Economic institute on America and the International Trade Organization, Mayflower Hotel, Washington.

June 16-18, Electric Metal Makers Guild: 16th annual meeting, Bethlehem, Pa. Secretary-treasurer of the organization is D. L. Clark, 39 Grasmere Rd., Lockport, N. Y.

June 18, American Foundrymen's Association: Annual meeting of association's technical correlation committee, LaSalle Hotel, Chicago. Association headquarters are at 222 W. Adams St., Chicago.

June 21-25, American Society for Testing Materials: Annual meeting and exhibit of testing apparatus and related equipment, Book-Cadillac Hotel, Detroit. Society headquarters are located at 1916 Race St., Philadelphia.

June 21-25, American Institute of Electrical Engineers: Summer general meeting, Mexico City, Mexico. Institute secretary is H. H. Henline, 33 W. 39th St., New York.

June 28-30, American Foundrymen's Association: Fifth annual chapter chairman conference, Hotel Stevens, Chicago. Society secretary-treasurer is William W. Maloney, 222 W. Adams St., Chicago.

June 28-July 1, American Electroplaters' Society: Annual convention and industrial finishing exposition, Ambassador Hotel, Atlantic City, N. J. Society headquarters are at 473 York Rd., Jenkintown, Pa.

July 16-24, American Road Builders' Association: 1948 convention and road show, Soldier Field, Chicago. Association headquarters are in the International Bldg., Washington.

July 21-23, American Society of Civil Engineers: Summer convention, Olympic Hotel, Seattle. Society headquarters are at 33 W. 39th St., New York.

July 26-27, Institute of Scrap Iron & Steel Inc.: Midyear meeting, Ambassador Hotel, Atlantic City, N. J. Institute executive vice president is E. C. Barringer, Dupont Circle Bldg., Washington.

Aug. 10-13, First Western Packaging Exposition and Conference: San Francisco Civic Auditorium, San Francisco.

Aug. 24-27, American Institute of Electrical Engineers: Pacific general meeting, Spokane, Wash. Institute headquarters are at 33 W. 39th St., New York.

Sept. 7-20, Department of State: First inter-American conference on conservation of renewable natural resources, Denver.

Sept. 13-17, Instrument Society of America: Third instrument conference and exhibit, Convention Hall, Philadelphia. Society headquarters are at 1117 Wolfendale St., Pittsburgh.

Sept. 20-25, American Mining Congress: Metal mining convention and exposition, San Francisco. Congress headquarters are in the Ring Bldg., Washington.

Sept. 28-Oct. 1, Association of Iron & Steel Engineers: Annual convention, Public Auditorium, Cleveland. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Military planners will not press for huge new steel expansion program; agree with industry enough metal can be provided for essential uses through limitations

PROPOSAL for a 10 million-ton steel ingot expansion, on top of present expansion, has been knocked in the head as far as military planners are concerned. This is the consensus of steel men following a conference June 3 between the Munitions Board and the Iron & Steel Industry Advisory Committee.

Whether civilian government economists who have been advocating a huge steel expansion will continue to press for such a program remains to be seen.

The question before the June 3 conference was this: In preparation for a possible emergency, would it be better to create large additional steel capacity at this time, or prepare to divert steel tonnage from less essential uses to take care of essential ones? General agreement was reached that by denying steel to less essential civilian and military uses enough steel could be provided to take care of essential needs.

Reasons—Steel expansion costs now are at a record high dollar level, which, on the basis of a big expansion program, would mean a permanently higher level of steel prices in the future due to sharply increased overhead expense; in other words, a big expansion program would contribute permanently to inflation.

Existing steel capacity cannot be kept in full production because of currently inadequate supplies and facilities. Main bottlenecks are the capacity of lake ships and ports, the supply of high-grade coking coal and the supply of scrap. These and other bottlenecks would prevent full utilization for a long time to come of an expanded steel capacity.

An above-normal steel expansion now is in progress and this, in view of the tight situation in raw materials and transportation facilities, is about all the expansion that it seems reasonable to undertake at this time.

In view of all these circumstances, a big expansion in steel capacity would be unwarranted at this time because it would worsen the present steel shortage. It takes 0.4 ton of steel for each ton added to capacity. It would take 4 million tons of steel to build 10 million tons of added ingot capacity.

Subcommittees Planned—Six subcommittees are to be organized to carry on studies at the request of the Munitions Board. These task groups will cover: Raw materials including scrap; finished rolled products; forgings; tool, alloy and stainless steel; and armor plate. At the request of the board, Walter S. Tower, as president, American Iron & Steel Institute, is to provide a slate of nominations which the board will consider in manning these subcommittees.

At the suggestion of industry men, a separate committee will be organized to represent the foundry industry—ferrous and nonferrous. The consensus was that the foundry industry has problems which are specialized and cannot be handled so well through the Iron & Steel Industry Advisory Committee. The National Castings Council is to be asked to supply a slate of names to guide the board in setting up a foundry industry advisory committee.

Continue Coal Research—As a result of the meeting, the Munitions Board will continue its work, through the Bureau of Mines, in the field of coal research to develop ways and means of getting better quality and greater coke yield from available coals.

Two additional stockpiling programs were recommended to the board—in electromanganese and in nickel oxide.

New Responsibility for BLS

Hitching of General Motors wage policy to the Bureau of Labor Statistics cost-of-living index has caused mingled elation and nervousness in the bureau. It is recalled how a few years ago labor unions condemned the index for not reflecting, as they contended, the impact of wartime shortages. Two investigations ordered by the White House gave the BLS index a clean bill of health, although suggesting adjustments of a minor character. This phase cost A. F. Hinrichs his job as acting commissioner of labor statistics, and paved the way for appointment of the present commissioner, Ewan Clague.

So far all has been well with Mr. Clague; he gets along with union leaders and employer representatives in general. But now that General Motors and the influential UAW-CIO have agreed to adjust wages on the basis of the BLS index, the situation could become highly dangerous. It is nothing new for unions and employers to hitch wages to the BLS index. But hitherto that has been done in the case of relatively small establishments.

Now the position of the Bureau of Labor Statistics is in considerable degree comparable to that of sitting on a sleeping volcano; if the BLS index at any critical moment does not reflect a cost-of-living level acceptable to either party, and particularly labor, there could be a violent eruption. Under the UAW agreement with General Motors, a 1.14 point movement in the BLS index is equivalent to a 1 cent adjustment in the hourly wage rate. That marks a degree of sensitivity that could spell trouble.

Working Capital High

Net working capital of United States corporations was estimated at the record level of $61.8 billion as of Dec. 31, 1947, an increase of $5.3 billion during the year, by the Securities & Exchange Commission.

The increase in net working capital during 1947 resulted from a rise of $12.4 billion in current assets, offset in part by a rise of $7.1 billion in current liabilities. In 1946 current assets rose $7.0 billion and current liabilities $2.3 billion.

In spite of the substantial increase in current assets, working capital at the end of December 1947 was in less liquid form than at the preceding year-end. Inventories showed the largest change of any item of current assets and liabilities, increasing by $6.3 billion to a total of $42 billion. This increase reflected to a considerable extent the substantial rise during 1947 in the prices paid for goods included in inventories. Notes and accounts receivable increased $5.7 billion during the year to a total of $35.7 billion.

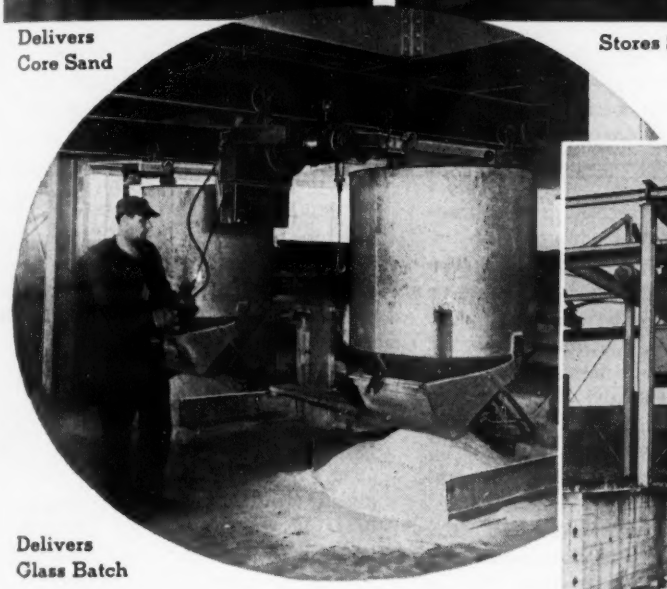
Export Appeals Board Created

An Appeals Board on export controls has been established in the Office of International Trade, Department of Commerce, to review applications of exporters who believe regulations of OIT work unreasonable

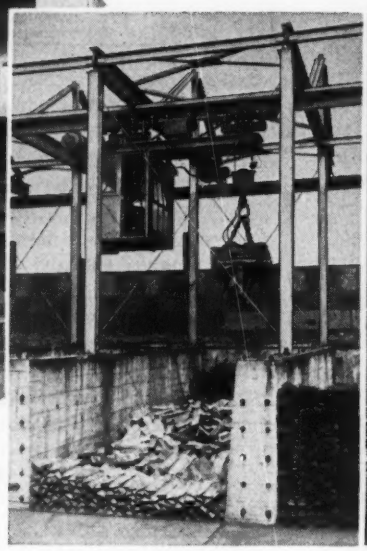
Delivers
Core Sand

Stores Sheet Steel

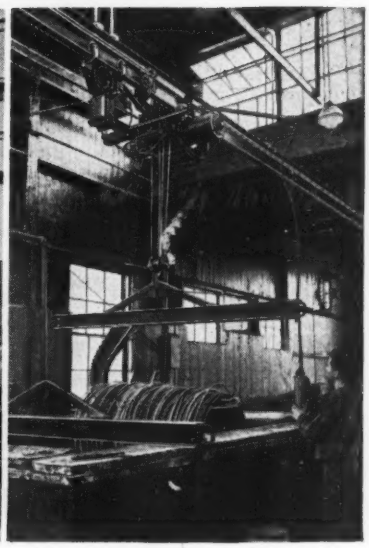
MONOTRACTORS Do the Hard Jobs



Delivers
Glass Batch



Stores Pig Iron



Cleans Wire Rod

American MonoTractor units perform automatic overhead handling operations with extreme accuracy and reliability. From unloading raw material to shipping finished products, these automatic carriers save costly handling labor by enabling unskilled help to spot heavy and cumbersome loads accurately and safely. American MonoTractors can be applied to carriers operating on any smooth bottom track. Let an American MonoRail Engineer show you how production goes up, handling costs go down when the hard handling jobs are done with American MonoRail MonoTractors and Systems.

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hardships or discriminate against them. The board will act mostly on applications for shipments to Russia and Russian-dominated countries.

Harrison Lillibridge, New York attorney who served on the appeals board of the War Production Board in 1943 and 1944, will be chairman of the new group.

The appeals board will not attempt to lay down a list of products which may or may not be exported to eastern Europe. Rather, each case will be reviewed individually. At present, there are four classifications of commodities ranging from those which have no war potential up to such items as aircraft engines which are considered 100 per cent war potentials. The two middle classes embrace items which have less than 100 per cent war potentials and contain many items which have been and which probably will continue to be licensed freely. Examples are machine tools for Russia and power generating equipment for Finland.

As a result of the creation of the appeals board and the clarification of policy instructions to that body, it is expected that licenses will be granted for the greater portion of goods remaining unshipped under old orders from Russia and her satellites.

Government Appointments

Marshall A. Shapiro, California Metal Co., Oakland, Calif., has joined the Office of Industry Co-operation, Department of Commerce, as assistant to Alex Miller, chief of the Scrap Section.

Garland S. Ferguson has been nominated by President Truman for reappointment to the Federal Trade Commission. He has been a member since 1927, served five terms as chairman.

Boris Shiskin, Russian-born economist for the American Federation of Labor, has been named chief of the labor division of the Paris office of the Economic Co-operation Administration, and will direct labor and manpower matters in the administration of the ECA program in Europe.

Tracy S. Voorhees, food administrator for the occupied areas of Europe, has been nominated assistant secretary of the Army.

Perjury Charges Threatened

A congressional committee has asked the Department of Justice to consider perjury charges against officials of a Michigan company being investigated for gray market steel operations. Rep. W. Kingsland Macy, chairman of a subcommittee to investigate questionable trade practices, identified the company as the Wayne Steel Co., Ecorse, Mich. The three individuals whose testimony was referred to the Justice Department are William W. Voisine, mayor of Ecorse and behind-the-scenes head of the company; Edward C. Sauve, who ran the firm; and Lee W. Oppenheim, a Detroit steelworker.

The action resulted from the committee's investigation of the complaint of an East Moline, Ill., toy manufacturer, that he had paid $60,000 in premiums to obtain 3000 tons of steel over the past two years. Representative Macy said Voisine and Sauve denied they had accepted premiums.

ALL-METAL GLIDER: The XCG-18A is the first all-metal glider designed specifically for use by the Army Field Forces in conjunction with the Air Force for assault purposes. The craft is undergoing tests at Air Materiel Command headquarters, Dayton, O.

German Scrap Moves Slowly

Government scrap officials continue trying to work out a plan under which up to 1 million tons of scrap can be shipped to the United States from Germany, but to date no headway has been reported. The negotiations are being conducted by the Commerce Department's Interdepartmental Ferrous Scrap Committee, headed by Alex Miller, with Lieut. Gen. Lucius Clay, military commandant, United States Forces in our occupied zone, on the one hand and the State Department on the other.

As far as Americans are concerned, a price of $26 to $27 f.a.s. Bremen on No. 1 heavy melting steel is figured to be about right—but in the absence of any business it is purely a nominal range. The $26 to $27 range includes the full reichsmarks price plus a 20 per cent dollar bonus.

In the meantime, scrap is moving to Bremen for a third boatload for delivery against the Army sale of 147,000 tons last year to the Canterbury Corp. So far two boatloads of Army scrap, aggregating 7000 tons, have been received in the United States.

Decontrol Act Extended

Second Decontrol Act has been extended by Congress through June 30, 1949. This continues force controls over tin, antimony and petroleum and certain other products. Control of transportation equipment and facilities of rail carriers is extended.

The extender sets forth the general policy: "To eliminate wartime emergency controls of materials except to the minimum extent necessary (1) to protect the domestic economy from injury which would result from adverse distribution of materials which continue in short world supply; (2) to promote production in the United States by assisting in the expansion and maintenance of production in foreign countries of materials critically needed in the United States; (3) to make available to countries in need, consistent with the foreign policy of the United States, those commodities whose unrestricted export to all destinations would not be appropriate; and (4) to aid in carrying out the foreign policy of the United States."

An important feature of the extender is continuance of the power to employ priorities for the production of materials and equipment for export when such export is necessary (1) to increase foreign production of goods urgently needed in the United States and (2) to aid in carrying out the foreign policy of the United States.

Rising Costs Plague Steel Producers

COSTS of raw materials required by iron and steel companies averaged 15 to 461 per cent higher on Mar. 1, 1948, than the average during 1936-1939, according to the American Iron & Steel Institute. Construction costs were 73 to 153 per cent higher. Freight rates averaged 27 to 62 per cent higher.

Palm Oil Cited — Of 28 raw materials the largest increase was 461 per cent for palm oil. Among other increases were: Fuel oil, 175 per cent; heavy melting scrap, 163 per cent; purchased coal, 129 per cent; ferromanganese, 64 per cent; and zinc 117 per cent.

Labor costs also have advanced sharply. Actual average earnings per hour by wage earners in iron and steel rose from $0.668 in 1936 to $1.573 in January, 1948.

Wages up Sharply—Steel companies paid out almost 500 million dollars more in wages and salaries last year than in 1946. In contrast, the companies netted only $159 million more in profits and they paid out $36 million more in dividends.

Earnings as a percentage of sales for 1947 averaged 6.3 per cent, which was below the years 1936, 1937, 1940 and 1941. High actual earnings of $422,847,067 were based on record peacetime sales volume.

Taxes Exceed Profits — Federal, state and local taxes in 1947, at $428,625,403, exceeded profits for the year. Dividend payments at $183,780,177 compared with $147,354,487 paid in 1946.

Invested capital of the 52 companies in the survey totaled $4,719,483,617, which was $200 million larger than the 1946 total, and largest since 1932. However, existing plant is greatly undervalued in relation to current replacement costs, which means depreciation allowances permissible under existing tax laws and based upon original cost of plant investments are inadequate to provide for replacements. As a measure toward offsetting this condition, several steel companies in 1947 made additional charges for depreciation, even though taxes had to be paid upon the extra funds allotted for depreciation over the amounts allowable by law. In 1947, these companies charged $232,624,777 toward depreciation and depletion, as compared with $167,822,175 in 1946.

Facts for Industry . . .

(As reported by government agencies)

Oil Burners—Downward trend of factory shipments of oil burners which began last November was continued in March, the 18,848 units shipped being 24 per cent less than the number shipped in February. Residential-type burners accounted for 88 per cent of the total. Unfilled orders at the end of the month were 124,190 units, an 8 per cent decline from the previous month. Shipments in 1947 were at an all-time high of 1.2 million units. *Census Bureau, Commerce Dept.*

Warm Air Furnaces—March factory shipments of warm air furnaces totaled 39,297 units valued at $6.8 million, an increase of 8 per cent over unit volume of shipments in February. Solid fuel consumption furnaces represented 54 per cent of the total, gas-fired 25 per cent and oil-burning 21 per cent. *Census Bureau, Commerce Dept.*

Water Heaters—Up 10 per cent above February, shipments of water heaters (except electric types) in March totaled 174,499 units, valued at $7.7 million. March production increased to 184,831 units. *Census Bureau, Commerce Dept.*

Construction Machinery—First quarter shipments of excavating and earthmoving equipment were valued at $130 million, 7 per cent higher than for the fourth quarter of last year. Leading in value were shipments of tracklaying tractors, which accounted for $42.1 million, 32 per cent of the total; power cranes and shovels were second at $38.1 million or 29 per cent; and road construction and maintenance machinery was third at $28.6 million or 22 per cent. Shipments for export declined 9 per cent to $20.5 million. *Census Bureau, Commerce Dept.*

Rubber Consumption—New rubber consumption declined to 85,281 long tons in April from 92,666 tons in March. April consumption was comprised of 50,651 tons of natural rubber and 34,630 tons of synthetic rubber. Reclaim consumption in the month was 22,023 tons. *Office of Domestic Commerce, Commerce Dept.*

Mechanical Stokers — Factory sales of mechanical stokers in April totaled 4826 units, a decrease of 10 per cent from the preceding month. Of the total 3951 were for residential use (other than apartment houses) and 254 were for use in small apartment houses and small commercial heating plants; these uses accounted for 87 per cent of the total. *Census Bureau, Commerce Dept.*

Metal Cans—Shipments of metal cans in 1947 totaled 2,956,116 short tons of steel, the highest output recorded since the survey was started in 1943, and was 7 per cent above 1946 shipments. The increase was centered in the nonfood can group, with these shipments increasing from 454,160 tons in 1946 to 809,515 in 1947. Nonfood cans represented 27 per cent of total shipments. *Census Bureau, Commerce Dept.*

Plumbing Fixtures — Manufacturers' shipments of plumbing fixtures in 1947 were valued at $187 million, compared with $120 million in 1946. Of the 1947 total $126 million was of metal fixtures, divided thus: Cast iron $82.5 million, steel $40.1 million, and aluminum, monel and other metal $3.6 million. *Census Bureau, Commerce Dept.*

Scales and Balances—Value of shipments of scales and balances (other than for laboratory use) amounted to $12.6 million during the first quarter. This was somewhat lower than fourth quarter, 1947, shipments of $13.1 million but was 25 per cent greater than shipments in first quarter, 1947. Of the major groups of scales and balances, only household and person-weighing scales showed increases over fourth quarter shipments. Shipments of industrial scales (including railroad track and motor-truck scales) accounted for $6.2 million, or 49 per cent of the total, retail and commercial scales for $2.9 million, and household scales for $3.0 million. Mailing and parcel post scales and accessories for scales were valued at $505,231. *Census Bureau, Commerce Dept.*

Industry Fairs Gage Revival In Europe

EVIDENCE of Europe's progress toward recovery was forcefully presented at three large industrial fairs recently—two on the continent and the third at Birmingham, Eng.

At Brussels, Belgium, 3700 participating firms demonstrated the country's increasing capacity to compete in world markets. Taking more space than last year's show and having an additional 400 companies represented, the fair's magnitude was proof of the country's industrial expansion.

One of the outstanding exhibits in the machinery section was a new planing machine built by S.A.F.A.K. of Liege. A new type of eccentric press was displayed by Belgium's Raskin company. Ateliers de Construction Electrique de Charleroi showed a large number of electric motors, high frequency heating furnaces, ultrasonic apparatus, dielectric heating equipment and a variety of electronic devices. Ateliers de la Meuse had on exhibit a new four-stroke diesel motor, while Philipps Industrial showed its complete range of electric and electronic apparatus for industrial and domestic purposes.

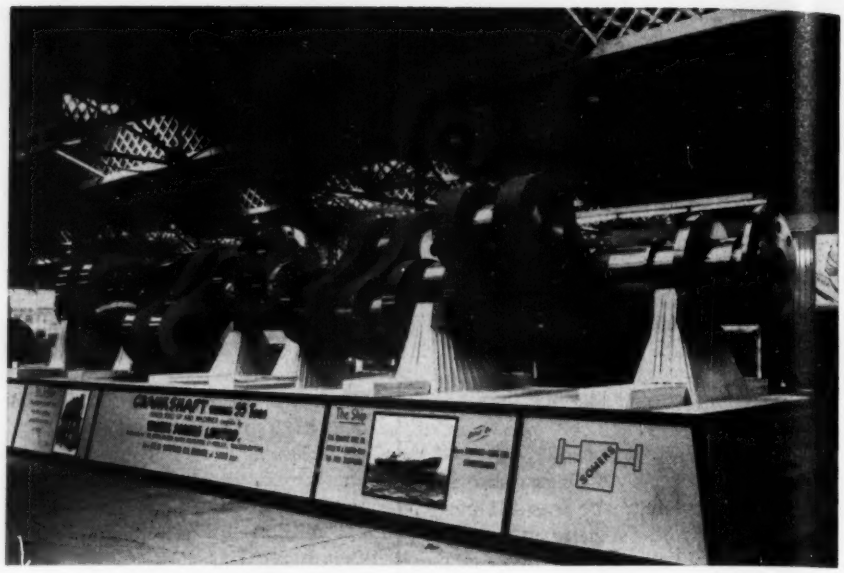
Size, Attendance Huge—The Paris Fair, far above prewar expositions in size and scope, brought together 9200 exhibitors and covered 125 acres. Included were 800 foreign exhibitors representing 23 countries. Attendance was estimated in excess of last year's 2,250,000 visitors.

The largest space was allotted to electrical appliances and construction and public works equipment, and for the first time in the fair's 44-year history refrigerating plant equipment was displayed. There were no machine tools shown at this fair although officials say they are to be included in next year's exhibits.

The Engineering & Hardware Section of the British Industries Fair at Birmingham had 1100 exhibitors and was devoted completely to products of the country's metalworking industries.

A leading sale made during the show was to Argentina for approximately $1 million of locomotive equipment and heavy machinery.

Vickers-Armstrong's exhibit illustrated its many-sided activities in supplying basic equipment for the engineering industries. Models of a condensing plant, winding machinery for mines and examples of variable-speed gears were featured in the display.



Fifty-five-ton crankshaft to be used in a cargo vessel was exhibited by Walter Somers Ltd. at the British Industries Fair in Birmingham

Metals Division, Imperial Chemical Industries Ltd., had on display corrosion-proof tubes, using new methods of manufacture from a copper-nickel-iron alloy. They are produced in diameters from ¼ inch to 12 inches.

Fabricated power presses of 6, 10 and 20-ton capacities featured Turner Bros. Ltd.'s exhibit. In comparison with products in last year's show much of the equipment displayed this year is available in a relatively short time, these Turner presses, for example, being quoted for two to ten-week delivery, depending upon the model.

Richard Thomas & Baldwins Ltd.'s exhibit stand was constructed primarily of the company's products, sheet, strip and tin plate. Stewarts & Lloyds Ltd. and subsidiaries displayed a multitude of steel products, ranging from tubular bridges to small fittings.

At the stand of Edgar Allen & Co. Ltd. a number of special corrosion-resistant steel castings of weldable quality for chemical plants were shown.

German Steel Problems Studied

DUSSELDORF, GERMANY

HOW TO RAISE German steel production resolves into two problems, answers to which are now being sought by top-level planners in the occupation government.

First of these problems is that of raw materials supply; second is the existence of overlapping authority which prevents co-ordinated planning within the industry to achieve higher production.

Supply of gas is one of the most serious bottlenecks to increased production. The steel industry now gets between 37 and 39 per cent of all gas production, much less than the proportion it received before the war. Open hearth output is hit particularly hard by the shortage as is the production of tubes and sheets, badly needed to fill some large export orders.

Coke supply is another formidable obstacle to greater output. Weekly solid fuel deliveries to the steel industry of Bizonia is 150,000 tons, of which 57 per cent is coke, not enough to maintain stockpiles. Unless a serious shortage is to arise, coal production must be increased or coke exports cut down. A shortage of limestone also exists but will be alleviated by imports of about one million tons from Belgium.

Confusion Reigns—The steel industry is also beset by confusion in its organizational set-up. The overabundance of bureaucracy has changed little since the Americans widened their hold over the steel industry in the British Zone, but a thorough cleanup of existing red tape seems to be in the air.

At present there are two top offices controlling steel production: The Iron & Steel Administration and the Custodian Office, both at Dusseldorf, although the former is part of the Economic Administration of Bizonia, with headquarters at Frankfurt, and

has as its job preparation of a monthly plan of steel production on the basis of monthly allotments of coal, gas and electric power. The Custodian Office is the boss of the newly created independent steel works.

In addition, a third office, the so-called R. D. & R. Branch, handles the dismantlings on reparations account, and its work is in no way co-ordinated with the other two bureaus. Dismantlings have been ordered without considering the effect on the overall planning for increased production, but a curtailment of this program seems imminent.

Demand Sustained for Belgo-Luxemburg Steel

LIEGE, BELGIUM

Export market for Belgian and Luxemburgian steel continues active with the "free" markets of Egypt and Argentina taking a good volume of current shipments. Deliveries to the organized markets with which commercial agreements have been signed are also well under way. A recently signed trade agreement with Great Britain provides for export of £84 million of Belgian and Luxemburgian products, of which £40 million are to go to the United Kingdom, £35 million to the outer sterling area and £9 million to the Congo sterling area. An agreement with Portugal provides for export by the Belgo-Luxemburg Union of 125,000 metric tons of steel products, and also machinery, motors, chemicals and textiles.

Domestically, steel demand is sustained and due to increasing production deliveries have been shortened except on plates and medium gage sheets.

Scrap prices are tending to stabilize at lower levels, although pig iron prices have been advanced to $55.90 per ton ex Althus works for foundry iron Si 2.5 to 3% and P 1.6 to 1.9%, $61.36 for iron with analysis of Si up to 3%, Mn 0.7% max. and P 0.5-0.7% max., and $64.20 for hematite iron Si up to 3%, Mn over 0.7% and P 0.06% max.

U.S. IRON AND STEEL EXPORTS—FIRST QUARTER

(Net Tons)

Semi-Finished and Finished Products:	January	February	March	First Quarter
Ingots, blooms, billets, slabs, sheet bars..	41,590	27,677	18,932	88,199
Wire rods	4,834	4,129	5,730	14,693
Skelp	5,969	4,552	6,498	17,019
Iron bars	1,032	368	434	1,834
Concrete reinforcement bars	13,924	11,243	14,357	39,524
Steel bars, cold finished	6,899	5,239	4,417	16,555
Other steel bars (excluding alloy)	39,797	31,857	37,310	108,964
Alloy steel bars	14,270	5,508	3,991	23,769
Welding rods, electric	945	1,306	1,987	4,238
Boiler plate	2,361	3,217	3,635	9,213
Other plates, not fab.	37,002	32,326	33,556	102,884
Plates, fab., punched or shaped	2,208	1,151	1,594	4,953
Iron sheets, black	1,828	2,220	1,295	5,343
Steel sheets, black	42,308	44,019	40,555	126,882
Galvanized sheets	4,396	4,115	4,211	12,722
Strip steel, cold rolled	6,587	5,122	4,961	16,670
Strip steel, hot rolled	7,346	7,264	7,664	22,274
Tin plate and tagger's tin	55,168	54,407	59,602	169,177
Terne plate (incl. long ternes)	646	513	1,204	2,363
Structural shapes, plain	29,813	28,946	30,972	89,731
Structural shapes, fab.	17,347	12,088	16,411	45,846
Frames and sashes	176	279	371	826
Sheet piling	5,112	4,106	2,253	11,471
Rails, 60 lbs. per yard and over	42,445	32,287	33,427	108,159
Rails, less than 60 lbs. per yard	752	414	422	1,588
Rails, relaying	5,950	1,033	139	7,122
Splice bars and tie plates	13,085	6,750	5,755	25,590
Frogs and switches	1,220	425	697	2,342
Railroad spikes	1,163	1,059	997	3,219
Railroad bolts, nuts, and washers	787	598	904	2,289
Car wheels, tires and axles	3,702	3,472	4,302	11,476
Seamless black pipe	1,419	1,568	2,064	5,051
Seamless casing and oil line pipe	14,307	17,773	20,295	52,375
Seamless boiler tubes	4,526	3,090	3,245	10,861
Welded black pipe	5,227	6,701	6,050	17,978
Welded galvanized pipe	3,821	3,391	3,911	11,123
Welded casing and oil line pipe	12,916	23,206	23,240	59,362
Welded boiler tubes	123	69	267	459
Other pipe and fittings	6,564	6,933	6,364	19,861
Plain wire	6,572	6,377	7,578	20,527
Galvanized wire	7,830	3,412	4,099	15,341
Barbed wire	7,251	3,661	2,237	13,149
Woven wire fencing	1,300	1,315	1,143	3,758
Woven wire screen cloth	477	488	386	1,351
Wire rope and strand	1,128	1,452	1,244	3,824
Wire nails	1,794	1,781	1,262	4,837
Other wire and manufactures	5,182	3,595	4,081	12,858
Horseshoe nails	89	92	83	264
Tacks	347	348	372	1,067
Other nails, incl. staples	1,191	827	953	2,971
Bolts, nuts, rivets and washers, except railroad	5,489	5,039	4,973	15,501
Forgings	2,515	2,139	3,199	7,853
Horseshoes	37	7	81	125
TOTAL	500,767	430,954	445,710	1,377,431

Source: United States Department of Commerce.

First Quarter Steel Exports Drop Sharply

UNITED STATES exports of iron and steel products, in line with the recent trend for exports generally, in the first quarter were 16 per cent below average quarterly overseas shipments in 1947. Aggregate first quarter tonnage was 1,377,431, according to the Department of Commerce.

March export shipments at 445,710 net tons were only 3 per cent higher than in February, although the industry's total shipments for sale in that month were 18 per cent higher.

Semifinished Exports Halved—The department's compilation of product shipments (see table) reveals several important developments during the year's first three months. Semifinished steel product exports, for example, have been halved, and sizable reductions are evident in track materials. On the other hand, exports of pipe and tubing have increased substantially in most classifications.

The same five finished products continued to lead in tonnage throughout the three-month period although their respective positions changed somewhat in that time. These five products were tin plate and tagger's tin at 169,177 tons for the quarter; black steel sheets, 126,882 tons; hot-rolled carbon bars, 108,964 tons; standard rails, 108,159 tons; and unfabricated plates, 102,884 tons.

Use of Purchased Scrap At Record Level in 1947

Consumption of 20,016,000 gross tons of purchased scrap by the iron and steel industry in 1947 set a new record, 1,336,000 tons higher than the previous peak in 1943, according to the American Iron & Steel Institute.

Despite this unequaled consumption, millions of tons of potential steel output have been lost since the end of the war because of shortage of purchased scrap and its poor quality.

The shortage is attributed by the institute to (1) export of over 20 million tons of scrap before the war; (2) shipment of about 123 million tons of steel products abroad during the war in the form of ammunition, arms and other supplies; (3) reduced rate of scrapping of automobiles, railroad equipment and other items as compared with the prewar rate; and (4) continuing high level of scrap consumption over the last two years.

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By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Auto industry starts upward climb in production and is breaking through 100,000 mark weekly. Chrysler position bolstered by inventories accumulated during strike

DETROIT

WITH WAGE issues generally settled, the industry has taken off to a new high production level, and production of cars and trucks now is breaking through the 100,000 per week pace. Chrysler Divisions, bulwarked by three weeks of inventory-building, are doing their best to move assemblies to a new peak. Ford is gradually building up output as the techniques of new model manufacture are assimilated. General Motors Divisions are pushing their production to the limit of steel supply and castings availability. The other independent producers likewise are bending every effort to move their output to new highs. The common complaint continues to be steel shortages, and despite the fact more steel is moving to motor plants than they received in the lush days of 1941, they still do not have enough.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1948	1947
January	422,324	366,205
February	399,460	393,636
March	519,126	443,588
April	461,348	445,137
May	355,400*	404,191
June		421,466
July		400,944
August		364,478
September		444,501
October		461,536
November		417,493
December		492,109
12 mos.		5,055,284

* Preliminary.

Estimates for week ended:

	1948	1947
May 22	91,138	96,651
May 29	92,772	79,315
June 5	75,959	98,499
June 12	105,000	97,943

Estimates by Ward's Automotive Reports

Fords Introduced in Style

Things were popping last week at the Waldorf-Astoria in New York, where the Ford Motor Co. went all out to introduce 1949 models. The entire grand ballroom was taken over for a display of the cars, the like of which has seldom been seen in the annals of the industry. Planning for the exhibit was initiated in May, 1947, and detailed work got under way in January of this year. The New York exhibit was under the direction of Walter Dorwin Teague, and the entire show was worked out in miniature before it was finally set up. More than 50 models, including actors and actresses in the various plays which are being staged daily at frequent intervals during the show, a work force of approximately 300, a complete police and detective force, and scores of hotel employees who have worked on the show in various technical capacities, gave their all for Ford last week.

A living room fitted with "Ford furniture" was set up to illustrate the spaciousness and comfort of the new models. Front seats from two cars served as divans, music blared from a car radio, two striking murals by Tadeusz Lipski, covering 17 x 21 feet, lent a colorful touch to the ceremonies. A 14-foot "man-made prospector" towered over the scene to give the '49er touch. The press, from Denver to Miami, from New Orleans to Minneapolis, beamed in hospitality the like of which has never been seen in the auto industry. Old-time observers of the scene remarked that the late Henry Ford must have been "whirling" in his grave.

Prices of the new models will be 8.7 per cent higher than for the 1948 models and are subject to adjustment in July after the company has had an opportunity to appraise production costs on the basis of actual experience.

Wage adjustments yet to be made by Ford may necessitate further upward adjustments.

Price increases range from $85 to $125, with 1949 models listing from $1113 for the 6-cylinder business coupe to $1980 for the custom 8-cylinder station wagon.

Ford Boosts West Coast Buying

Ford Motor Co. purchases of materials on the West Coast will amount to over $27 million this year, compared with a rate of less than $15 million early in 1947, according to Victor G. Lottman, director of the company's purchasing research department, who spoke before the recent annual convention of the National Association of Purchasing Agents in New York.

The increase in Ford's materials purchases on the West Coast is in line with the firm's policy announced

An auto-hungry public was given its first glimpse of the 1949 Fords last Wednesday. The club coupe shown here illustrates the low-silhouette of the new models. Front and rear seats are wider, although tread is narrower

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early in 1947 that it would try to increase purchases of materials in that area to $50 million annually. Higher freight rates are making it increasingly important that the company localize its purchases, Mr. Lottman said. Ford's annual rail and truck freight bill is now $20 million more than a year and a half ago, he disclosed. Decreased costs through savings in time can also be achieved through local purchasing. Freight time from the East to the Coast averages ten days, and Ford wishes to avoid carrying large transit inventories.

Auto Prices, 1941 vs. 1948

ADVERTISED delivered prices for passenger cars, at point of manufacture, as published by *Automotive News*, Detroit, including delivery and handling charges and federal taxes, but not including state taxes, transportation or optional equipment, follow:

	1941	1948	% incr.
Buick 40, 4-dr.	$1052	1673	59
Buick 50, 2-dr.	1185	1929	63
Buick 70, 4-dr.	1364	2232	64
Cadillac 61, 4-dr.	1535	2647	67
Cadillac 62, 4-dr.	1585	2781	75
Cadillac 75, 4-dr.	2995	4471	49
Chevrolet, master-del. vs. Stylemaster 4-dr.	754	1276	69
Chevrolet, spec.-del. vs. Fleetmaster 4-dr.	810	1345	66
Chrysler Royal, 4-dr.	1051	1773	69
Chrysler Windsor, 2-dr.	1075	1805	68
Chrysler New Yorker, sp. cpe.	1268	2195	73
DeSoto, 4-dr. deluxe	995	1656	67
DeSoto, 4-dr. custom	1045	1709	64
Dodge, 2-dr. deluxe	880	1513	72
Dodge, 4-dr. custom	965	1608	66
Ford V-8 bus. cpe.	695	1255*	80
Ford V-8 4-dr.	775	1375*	77
Ford V-8 Superdel. vs. Custom 2-dr.	780	1415*	81
Ford V-8 Superdel. vs. Custom 4-dr.	820	1475*	80
Hudson Commodore 8, spt. cpe.	1040	2226	114
Hudson Commodore 6, 4-dr.	994	2161	118
Nash 600, 4-dr.	780	1464	88
Nash Ambassador 6, sed-cpe.	974	1763	81
Oldsmobile 66, 6, 4-dr.	945	1556	65
Oldsmobile Futuramic vs. Cust. Cruiser, 8, 4-dr.	1135	1993	76
Packard, del. 8 vs. 120, 4-dr.	1261	2375	88
Packard, sup. 8 vs. 160, 4-dr.	1750	2690	54
Packard cust. 8 vs. 180, 4-dr.	2587	3675	42
Plymouth del. 2-dr.	779	1247	60
Plymouth spec. del. 4-dr.	840	1378	64
Pontiac Torpedo 6, sed.-cpe.	864	1484	72
Pontiac Streamliner 8, sed.-cpe.	948	1595	68
Studebaker Champion 2-dr.	795	1514	90
Studebaker Commander 2-dr.	1050	1819	73

* Prices for 1949 model; Ford did not include taxes in 1941 prices.

Note: A number of factors must be kept in mind in reviewing these price changes. Several models are completely new designs—larger, more powerful, heavier, more luxurious—among them Ford, Hudson, Packard and Studebaker. Absorption of developmental and tooling costs naturally brings their price increases disproportionately higher than other makes little changed basically from 1941. Some changes in model designations, inclusion of extra equipment as standard and other refinements of the pricing structure make exact comparisons in all cases difficult; however, as nearly as possible, the attempt has been made to select comparable models. Unweighted for production volume, average price increase for all the above makes is 72.2 per cent, or about the equivalent of average increase in basic hourly automotive wages since 1941, not counting the most recent upward adjustments or "collateral" wage payments excluded from basic rates. It must also be recognized that accessories and optional equipment for passenger cars are sharply higher in price and usually will add anywhere from $200 to $500 to the above prices.

Names in the News

Another automotive pioneer — Charles W. Nash—has joined the ranks of the industry's immortals, bringing to five the number of great names which have passed on since the Golden Jubilee celebration in 1946. Mr. Nash died in California June 5 at the age of 84, after a lengthy illness. He rose from a poor farm boy to be president of General Motors Corp. in its early years and, like the late William C. Durant with whom he was associated for many years, was an organizing genius who had the knack for picking the right man for the right job and for making millions where only pennies had grown. He was credited with persuading the late Walter P. Chrysler to leave the locomotive business and bring his talents to automobile manufacturing, and also sold George W. Mason on the idea of consolidating his Kelvinator Corp. with Nash Motors to form the present Nash-Kelvinator Corp.

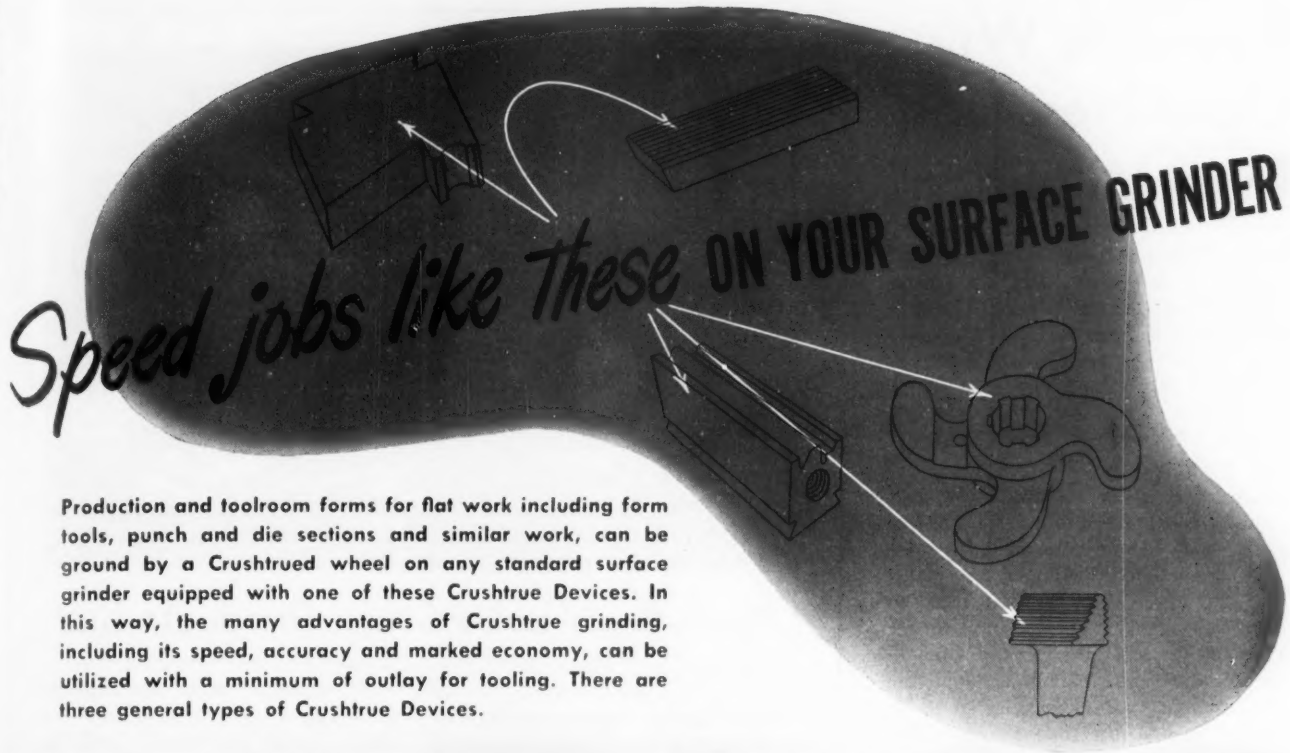
In tribute, the Automobile Manufacturers Association said of Mr. Nash that he "belongs not merely to the small group of immortals of the American automotive industry; by virtue of what he achieved despite the adversities of his humble beginnings he stands high on the list of those who have proved, by their own lives, the possibilities of the American way of life."

William C. "Billy" Ford, still to be graduated from Yale University, and the youngest of the three sons of the late Edsel Ford, has been elected a director of Ford Motor Co., succeeding B. J. Craig who has been a director for five years and will continue as secretary-treasurer of the Ford Foundation.

Harold S. Vance, president and chairman of the board of Studebaker Corp., and E. J. Bush, president of Diamond T Motor Car Co., have been elected vice presidents and directors of the Automobile Manufacturers Association, Vance taking over the two AMA posts formerly held by Paul G. Hoffman and Bush replacing Robert F. Black, president of White Motor Co., who will continue as an AMA director.

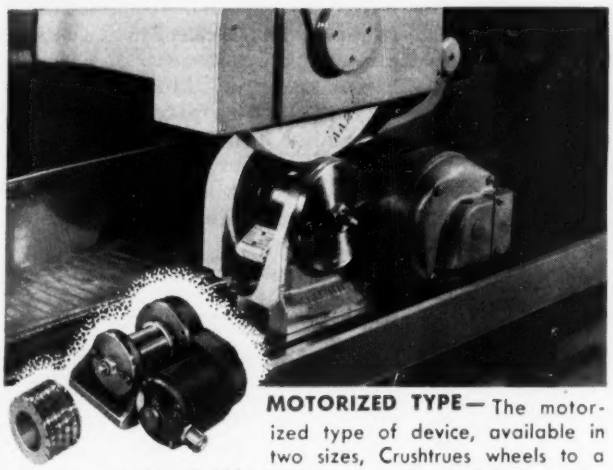
Pontiac Backlog Heavy

Pontiac division of General Motors has a backlog of orders approaching 600,000 units, according to Harry J. Klingler, general manager. Reception of Hydra-Matic in Pontiac has been excellent, Mr. Klingler says.

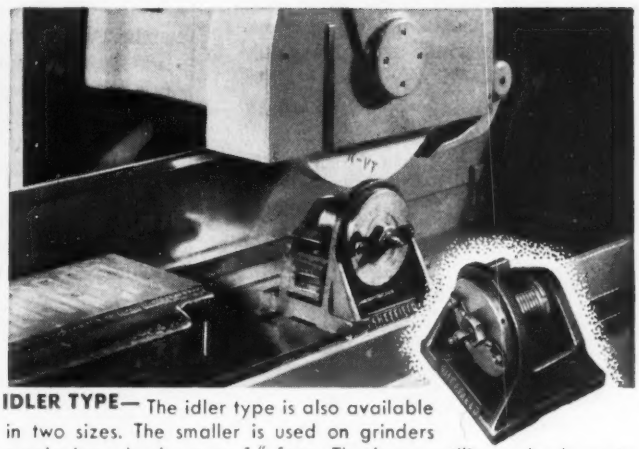


Speed jobs like these ON YOUR SURFACE GRINDER

Production and toolroom forms for flat work including form tools, punch and die sections and similar work, can be ground by a Crushtrued wheel on any standard surface grinder equipped with one of these Crushtrue Devices. In this way, the many advantages of Crushtrue grinding, including its speed, accuracy and marked economy, can be utilized with a minimum of outlay for tooling. There are three general types of Crushtrue Devices.

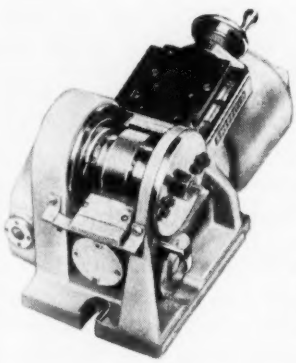


MOTORIZED TYPE— The motorized type of device, available in two sizes, Crushtrues wheels to a width of 3⅛" and is generally used for quantity production operations.



IDLER TYPE— The idler type is also available in two sizes. The smaller is used on grinders employing wheels up to 1" face. The larger utilizes wheels up to 3⅛" face. The units are generally used on grinders which have a slow speed spindle drive (approximately 300 fpm).

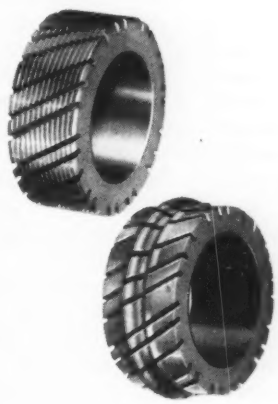
SELF-TRUING TYPE



The self-truing type is engineered especially for producing parts which must be held to a very high degree of uniformity. It incorporates a flat carbide form tool which is used to periodically reform the cast iron Crushtrue Roll without removing the roll from its mounting.

CRUSHTRUE ROLLS

Sheffield is prepared to regrind promptly, any Crushtrue Roll after it has become sufficiently worn in service. In addition to that, a large stock of standard rolls is maintained for immediate delivery or in exchange for rolls sent in to be reground. The Bank includes all Standard U.S. threads from 8 to 32 pitch inclusive.



Sheffield **would like to send you new literature describing Crushtrue grinding and its outstanding economic advantages.**

Thread and Form Grinders
Microform and Visualform Grinders
Gear Chamfering
Burring and Burnishing Machines
Crushtrue Rolls and Fixtures
Special Machine Tools

MASTER CRAFTSMEN SHEFFIELD HEADQUARTERS

the *Sheffield* corporation

Dayton 1, Ohio, U. S. A.

2982

Republic Will Open New Line Pipe Mill Soon

THE STEEL industry's capacity for producing large diameter line pipe will be augmented when Republic Steel Corp.'s new mill at Gadsden, Ala., begins operating about June 15. Designed to produce line pipe of 24 in., 26 in., and 30 in. o.d., the mill's capacity will be from 10,000 to 12,000 tons a month.

This will mark the first time Republic's southern facilities have made pipe, and by producing large size line pipe will be opening a new sales field for the company, which up to now has made line pipe not larger than 16 in. o.d. Because of the exceptionally heavy demand for line pipe the new mill's production is already booked up for the next two years. Decision to build the mill at Gadsden was predicated on nearness to the area in which the pipe would be used and availability of steel plate.

Started Year Ago—The new mill, on which construction was started last summer, is approximately 200 ft wide and 800 ft long and is attached to the company's plate mill.

An electric fusion process will be used to weld the pipe which will be formed from plate approximately 94 in. wide and 30 ft long. In this process the pipe remains stationary and the welding heads move back and forth along the seam, thereby obviating the necessity of moving the heavy pipe during the welding process. Outside of the seam is welded first, followed by welding of the inside, after which the pipe is tested hydraulically. In most instances, two 30-ft lengths of pipe will be welded together to form 60-ft lengths.

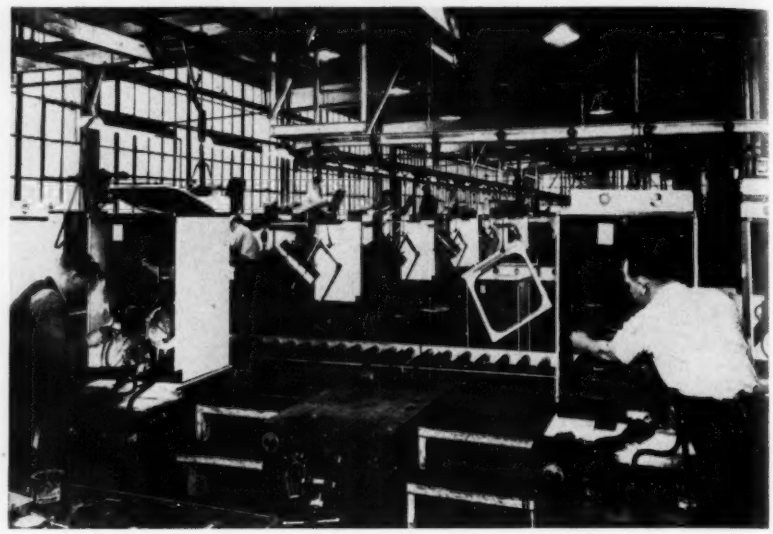
Include Loading Facilities—The new mill will include facilities for loading trucks as well as railroad cars, for a substantial tonnage of the 60-ft long pipe is to be hauled directly from the mill to the field on specially equipped trailers.

While the new mill will take a considerable portion of the Gadsden plate mill's output, there still will be some plate available for sale, the company said.

Youngstown Coke Ovens—Republic will also build a battery of 38 coke ovens at its Youngstown steel plant, although coke production will not be greatly increased because some of the oldest existing ovens will be dismantled.

Construction of the new battery, adjacent to the present coke plant, will be undertaken by Koppers Co. The battery will be in production in June, 1949. The facility will be designed for coke oven gas under-firing. Ovens will carbonize 878 tons of coal per day when operating at 17 hours coking time and based on coal at 50 pounds per cubic foot. No additions are contemplated for the by-product or benzol equipment.

This project is part of a general modernization and improvement program at Youngstown. Other phases of this program, now completed or in progress, include installation of high top pressure blast furnace blowing equipment on three of the five blast furnaces and improvement of the plate mill which permits production of hot-rolled strip steel.



Apex Buys Lake State Products Inc.

Apex Electrical Mfg. Co., Cleveland, has rounded out its line of home cleaning appliances through purchase of Lake State Products Inc., Jackson, Mich., maker of the Dishamatic electric dishwasher and the Cinderella portable clothes washer. Other Apex products include upright, cylinder and hand-type vacuum cleaners, standard and automatic washers, and ironers.

The Lake State Products plant will be operated as a wholly-owned subsidiary. No change in plant personnel is contemplated.

The Jackson plant has capacity to produce 50,000 dishwashers annually and production will be geared to expected requirements as rapidly as possible. Photo shows a view of the dishwasher assembly line at Lake State Products.

Tub, lid and top frame of the automatic dishwasher are porcelain and front and side panels are baked white enamel. It contains a heavily-insulated, thermostatically-controlled hot water booster tank.

Navy To Sell or Lease Seattle Iron Works

Isaacson Iron Works, Seattle, largest plant of its kind on the Pacific Coast, is being offered for sale or lease by the Navy's Bureau of Yards & Docks. Works includes a complete forging and machine shop and electric ingot plant.

Built in 1943 at cost to the government of $4,106,000, the plant has two Electromelt furnaces with a rated capacity of 25 tons each, facilities for the production of heavy steel castings from scrap, and heating, forging, annealing, testing, machining and shipping facilities.

Sale or lease will be subject to recapture clause in event of emergency.

Montreal To Build 60 Locomotives for India

Montreal Locomotive Works Ltd., Montreal, Que., Canada, has received a $7,500,000 order from the Indian Government Railways for 60 steam locomotives.

Delivery of these 4-6-2 Pacific type units will begin next February. This firm is already building 90 2-8-2 Mikado type locomotives for India. Payment for the new order will be made in U. S. dollars.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Economic Co-operation Administration reports authorizations for shipment of foodstuffs and commodities under the European Recovery Plan totaled $208,095,509, including ocean freight, as of May 30.

—o—

Columbia University, New York, will conduct a training conference in industrial experimentation Sept. 14-18. Course is intended to provide formal and practical insight into fundamental techniques for persons with a background of experience and at least one course in statistics, quality control, or the equivalent.

—o—

American Railway Car Institute, New York, reports that domestic freight cars delivered during May totaled 9192. Deliveries for the past six months have averaged 9130 monthly.

—o—

Central Machine Works Corp., manufacturer of bearings, pumps, diesel engine parts and heavy machinery, has moved to 340 29th Ave., Oakland, Calif.

—o—

Melin Industries Inc., manufacturer of garden tractors, plans to move from Cleveland to 313 Gougler Ave., Kent, O.

—o—

Eureka Williams Corp., Detroit, has announced price reductions ranging up to 10 per cent on its Eureka vacuum cleaning equipment.

—o—

Los Angeles Chamber of Commerce reports that a total of $124,811,000 was spent for all industrial development in Los Angeles county during 1947. Of this amount, $70 million was spent for new factories and nearly $55 million for expansions.

—o—

Niagara Duplicator Co., manufacturer of duplicating machines and related equipment and supplies, has consolidated its San Francisco and Concord, Calif., plants at Concord.

—o—

American Washer & Ironer Manufacturers' Association, Chicago, reports sales of standard-size household washers in April totaled 393,660 units, compared with the all-time record figure of 398,298 units for March. The April, 1948, figure was 22 per cent above that for the corresponding month a year ago.

—o—

Beatty Machine & Mfg. Co., Hammond, Ind., manufacturer of punches, presses, shears, spacing tables and related equipment, is expanding its export sales, with shipments in recent months going to France, Brazil, New Zealand and Venezuela.

—o—

Chicago Association of Commerce & Industry reports new industrial developments in the Chicago area during May totaled $7,762,000, compared with $10,239,000 for the corresponding month a year ago.

—o—

United States Air Force has authorized release of the J-33-21 engine to approved airframe manufacturers for potential use in commercial transport aircraft. The engine is manufactured by Allison Division of General Motors Corp. as Model 400-C4.

—o—

Medina Iron & Brass Co., Medina, N. Y., is sand casting aluminum alloy soil pipe and fittings. The foundry has turned to aluminum because of the pig iron shortage.

—o—

Industrial Electronic Engineering Corp., manufacturer of electric processing equipment and allied products, is the new name of Bluemound Specialty Co. which has been purchased by E. R. Werych Jr., new president. Firm's address remains at 2219 N. 31st St., Milwaukee.

—o—

General Electric Co., Schenectady, N. Y., reports that it manufactured 23 turbine-generators, with a combined capacity of more than 960,000 kw, during the first four months of this year for a new production record.

—o—

United States Rubber Co., New York, has installed a conveyor belt, which will move more than 700 tons of iron ore per hour in a mine operated by Cleveland-Cliffs Iron Co. near Hibbing, Minn. The 2300-ft belt replaces a rail haulage system.

—o—

Resistance Welder Manufacturers Association, Detroit, reports new orders placed during April for spot, seam, butt and projection welding equipment were 10 per cent higher than in March. First quarter shipments have already exceeded the total annual volume of shipments just prior to the war.

—o—

Alabama production of soft coal for the first four months of this year was 5,405,199 tons, as compared to 6,161,000 tons for the same period last year.

—o—

J. F. Reed Mfg. Corp. has been newly formed at 286 Hamilton St., New Haven, Conn. Firm will specialize in the design and manufacture of plating and heat treating racks and accessory equipment.

—o—

American Iron & Steel Institute estimates that the iron and steel industry makes use of nearly 5 billion gallons or 21 million tons of water daily. In the aggregate, this is a greater tonnage than all the raw materials used annually by the industry.

—o—

Continental Oil Co., Ponca City, Okla., has purchased a toluene plant at Ponca City from War Assets Administration for $175,000. Continental will convert the facilities to oil refining. Firm has also bought a carbon black plant at Sunray, Tex., for $1,100,000 from WAA.

—o—

Jeffreys Engineering & Equipment Co., manufacturers' representative for metalworking equipment and machine tools in Virginia and North and South Carolina, will move to Guilford Bldg., Greensboro, N. C., July 1. Firm has been located in Raleigh, N. C.

—o—

Watson-Stillman Co., Roselle, N. J., manufacturer of hydraulic equipment, is this year celebrating its 100th anniversary. Firm was first formed in New York City, but moved to its present location in 1904.

—o—

Western Society of Engineers, Chicago, has moved its headquarters from 205 W. Wacker Dr. to 84 E. Randolph St.

—o—

Gulf Oil Corp. and **Koppers Co. Inc.,** both of Pittsburgh, have signed an agreement calling for co-operative research and development of processes for conversion of coal to gas and liquid fuels.

—o—

Columbian Carbon Co., New York, has bought a carbon black plant and additional facilities in Seagraves, Tex., from War Assets Administration for $1,420,000. Columbian plans to double the current annual capacity of 12 million pounds of carbon black.

—o—

Gray Iron Founders' Society Inc., Cleveland, has published a cost dictionary, designed to assist foundry clerical personnel in classifying all items of foundry expense. The manual was developed by J. L. Carter, the society's cost consultant.

The Business Trend

MEMORIAL DAY observance, coupled with curtailment of operations by many industries in the Pacific Northwest due to flood conditions, was reflected in the nation's reduced level of industrial production for the week ended June 5. Least affected basic activity indicator was the steel ingot rate, but elsewhere on the production scene sharp reductions caused an 11-point drop in STEEL's index to 153 per cent (preliminary) of the 1936-1939 weekly average. During the Memorial Day week last year industrial production as measured by the index declined 10 points to 150 per cent of the base prewar years.

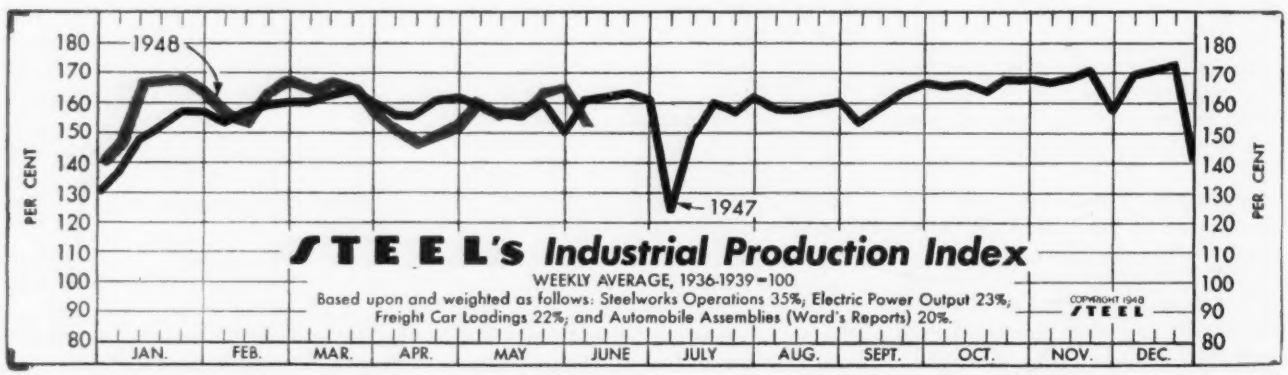
AUTOS—Damage to power plant and heat-treating equipment at Chrysler Corp. when the recent walkout began kept its divisions closed during the June 5 week and accentuated the industry's output loss because of the holiday. U. S. and Canadian turnout was 75,959 units, according to *Ward's Automotive Reports*. The industry now believes that meeting its projected June volume of 500,000 units will prove an arduous task, particularly because of recent disappointing receipts of steel sheet and strip. In addition, the iron shortage has become so acute as to compel many companies to revise their replacement parts programs so that original equipment schedules can be met.

STEEL—Growing demand for steel products for defense preparations and from several domestic industries under the voluntary allocation program intensifies interest in current negotiations between the coal operators and the United Mine Workers. Another strike would set forward into the indefinite future the time when supply and demand come into balance. Many observers look for only a two-week vacation by the miners after the current contract runs out at the end of this month, but point out the possibility of a longer walkout if contract terms are not settled by that time.

CARLOADINGS—Jumping to the highest level since last November, freight car loadings in the week ended May 29 totaled 904,848. Coal loadings accounted for 203,052 cars and brought the coal car total for month to 992,197, the highest May total on record.

FACTORY SALES—Estimates by the Office of Business Economics, Department of Commerce, place volume of manufacturers' sales in April at $17.3 billion, down 4 per cent from the March level. Durable goods industries, however, reported a sharper decline—approximately 6 per cent—as the result of the coal strike. Their aggregate sales were $6.9 billion.

CONSTRUCTION—Civil engineering construction in May was valued at $535,184,000, 14 per cent below the April average but 30 per cent over last May's level. In March, physical production of building materials made a 15.2 per cent gain, with all 20 of the materials included in the Department of Commerce survey participating. Shipments of concrete reinforcing bars were up 18 per cent, wire nails and structural steel 15 per cent, and cast iron soil pipe 12 per cent.



Index (chart above): Week ended June 5 (preliminary) 153 Previous Week 164 Month Ago 158 Year Ago 161

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	95.5	96.0	92.0	96.5
Electric Power Distributed (million kilowatt hours)	4,845	5,076	5,087	4,635
Bituminous Coal Production (daily av.—1000 tons)	2,302	2,278	2,300	1,999
Petroleum Production (daily av.—1000 bbl.)	5,476	5,452	5,413	5,064
Construction Volume (ENR—Unit $1,000,000)	$135.0	$189.9	$113.3	$121.1
Automobile and Truck Output (Ward's—number units)	75,959	92,772	84,684	98,499

* Dates on request. † 1948 weekly capacity is 1,802,476 net tons. 1947 weekly capacity was 1,749,928 net tons.

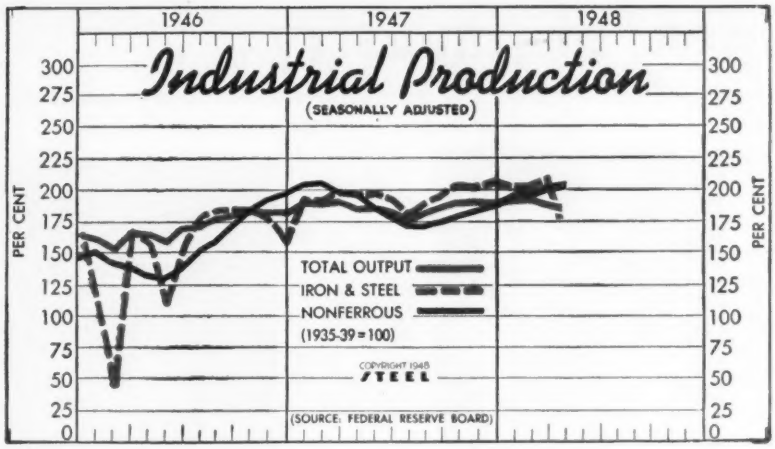
TRADE				
Freight Carloadings (unit—1000 cars)	820†	905	881	901
Business Failures (Dun & Bradstreet, number)	91	112	108	66
Money in Circulation (in millions of dollars)‡	$27,895	$27,700	$27,762	$28,261
Department Store Sales (change from like wk. a yr. ago)‡	+18%	+7%	+7%	+12%

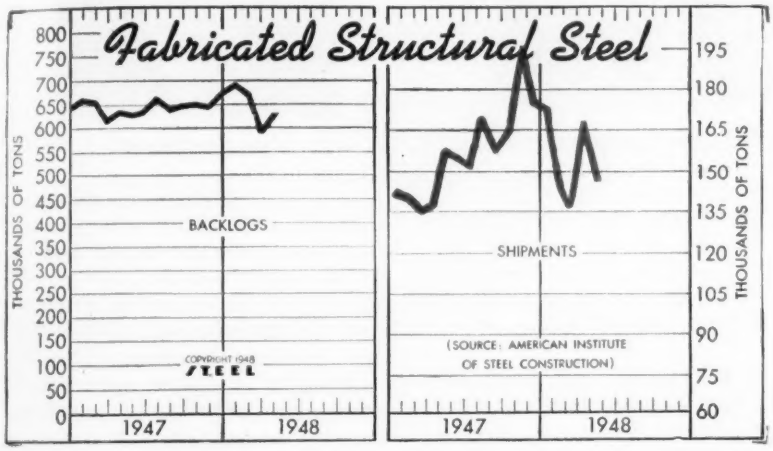
† Preliminary. ‡ Federal Reserve Board.

Federal Reserve Board's Production Indexes

(1935-39=100)

	Total Production		Iron, Steel		Nonferrous	
	1948	1947	1948	1947	1948	1947
Jan.	193	189	203	192	197	203
Feb.	194	189	203	191	197	208
Mar.	192	190	207	196	200	202
Apr.	187	187	177	195	201	197
May	...	185	...	197	...	187
June	...	184	...	193	...	179
July	...	177	...	181	...	172
Aug.	...	182	...	188	...	171
Sept.	...	186	...	195	...	174
Oct.	...	190	...	204	...	179
Nov.	...	192	...	202	...	185
Dec.	...	192	...	205	...	189
Ave	...	187	...	195	...	186





Fabricated Structural Steel

(000 Tons)

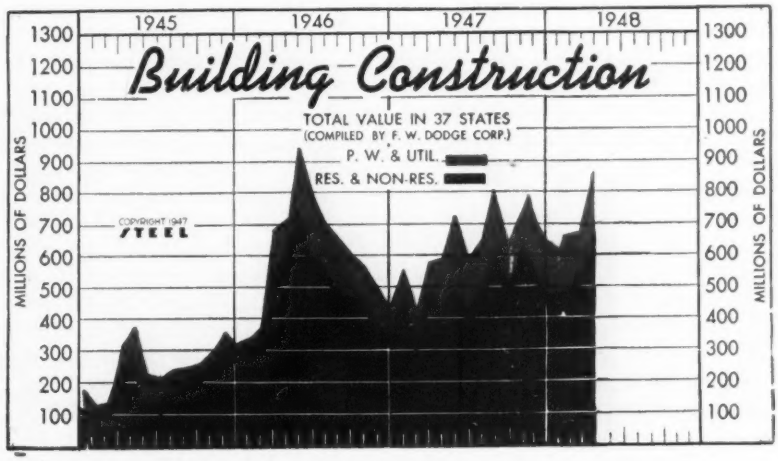
	Shipments			Backlogs		
	1948	1947	1946	1948	1947	1946
Jan.	146.4*	140.6	107.5	692	661	552
Feb.	141.6*	136.1	63.8	673	656	551
Mar.	167.0*	137.8	102.8	597	614	605
Apr.	149.3	157.4	122.5	630	632	674
May	....	155.0	124.4	...	628	615
June	....	151.9	126.8	...	634	642
July	....	169.9	140.2	...	661	674
Aug.	....	158.0	157.5	...	639	651
Sept.	....	164.3	141.9	...	648	682
Oct.	....	196.1	164.7	...	649	660
Nov.	....	175.0	157.3	...	645	665
Dec.	....	173.0	142.1	...	671	646
Total	....	1,915.1	1,551.6			

* Revised

Construction Valuation in 37 States

(Unit—$1,000,000)

	Total	Public Works Utilities		Residential and Non-residential	
	1948	1948	1947	1948	1947
Jan.	615.2	136.6	113.9	478.6	457.7
Feb.	682.0	177.3	90.5	504.6	351.6
Mar.	689.8	164.3	122.0	525.5	474.8
Apr.	873.9	184.7	161.4	689.2	441.0
May	....	....	252.9	....	490.0
June	....	....	185.7	....	419.4
July	....	....	165.9	....	494.4
Aug.	....	....	223.5	....	599.7
Sept.	....	....	141.5	....	508.4
Oct.	....	....	165.9	....	627.4
Nov.	....	....	181.5	....	533.6
Dec.	....	....	154.1	....	471.3
Totals	....	....	1,958.8	....	5,869.3



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$11,749	$14,097	$13,508	$11,354
Federal Gross Debt (billions)	$251.9	$252.2	$252.1	$257.4
Bond Volume, NYSE (millions)	$15.3	$28.4	$22.2	$13.8
Stocks Sales, NYSE (thousands)	5,003	8,234	7,463	3,209
Loans and Investments (billions)†	$63.1	$63.5	$62.9	$63.2
United States Gov't. Obligations Held (millions)†	$35,298	$35,866	$35,475	$39,220

† Member banks, Federal Reserve System.

PRICES

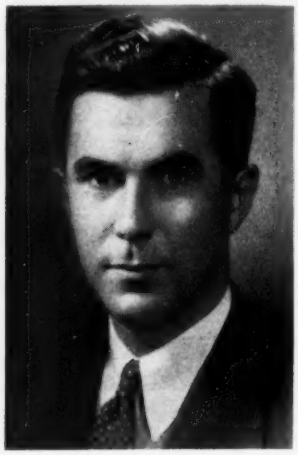
STEEL's composite finished steel price average	$80.27	$80.27	$80.27	$69.82
All Commodities†	164.4	163.5	162.6	147.4
Industrial Raw Materials†	180.8	178.6	176.8	161.1
Manufactured Products†	159.1	158.7	157.9	142.5

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

RAYMOND H. SCHAEFER

JAMES C. HARTLEY



DR. R. F. MILLER

Raymond H. Schaefer has been appointed director of research and development, American Brake Shoe Co., New York. He started with the company in 1940 as an assistant foundry metallurgist, American Manganese Steel Division, and in 1945 became chief metallurgist in charge of metallurgical research and the company's experimental foundry.

—o—

Richard N. Jones has been appointed vice president in charge of sales, Lustron Corp., Columbus, O. He has had a background of 20 years' experience in development and study of marketing, merchandising and sales problems, and was associated in the past with *Building Age, Architectural Forum,* and Time Inc. **Lt. Gen. Eugene Reybold,** retired, U. S. Army Engineers Corps, has been appointed vice president in charge of operations for the company.

—o—

Frank H. Connolly, formerly with the Mobilift Division, Vaughan Motor Co., manufacturer of industrial trucks, has been appointed general sales manager, Wright-Hibbard Industrial Electric Truck Co. Inc., Phelps, N. Y.

—o—

Louis M. Hull, sales manager, Hammel Radiator Engineering Co., Los Angeles, has been elected vice president in charge of sales, office personnel and office manager. **Robert A. Martinson,** in addition to his duties as secretary-treasurer, has been placed in charge of purchasing, production and factory personnel. **R. E. Washburn** has been appointed general field engineer.

—o—

Aubrey Ozias has been named field engineer, Threadwell Tap & Die Co., Greenfield, Mass., a subsidiary of Sheffield Corp., Dayton, O. For the past 10 years Mr. Ozias has been cutting tool engineer for Ford Motor Co. and Continental Motors.

—o—

James C. Hartley has been appointed vice president, general manager and director of Barium Steel & Forge Inc., subsidiary, Barium Steel Corp., New York. Mr. Hartley will occupy the positions formerly held by **Glenn W. Shetler,** resigned. Mr. Hartley joined Barium Steel & Forge in 1946 in the capacity of chief metallurgist, and in 1947 was made manager of metallurgy and sales. In recent months he has been in close contact with Barium sales outlets. He joined the steel industry in 1930 as research assistant for Crucible Steel Co. of America, Harrison, N. J., and left Crucible to develop the Dolan-Hartley Beryllium Reduction Process, a method for producing alloys of beryllium metal. In 1936 Mr. Hartley joined **Prof. Otto H. Henry,** Brooklyn Polytechnic Institute, in opening a metallurgical consulting office. During the early part of the war, Mr. Hartley acted as chief metallurgist for Aluminum Forgings Inc., Erie, Pa., and then joined Heppenstall Co. of Pittsburgh as director of research before coming to Barium Steel & Forge Inc. in 1946.

—o—

Raymond Willey, president, Harbison-Walker Refractories Co., Pittsburgh, will retire July 1, 1948. **Earl A. Garber,** vice president and general manager, will succeed Mr. Willey, who has been president since 1939. Mr. Willey first became associated with the company in 1901 as assistant to the supervisor of magnesite purchases in Budapest, Hungary, where he had been engaged as vice consul with the United States consular service. He returned to this country where he served in various capacities until 1913, when he became assistant to the vice president in charge of operations at Pittsburgh. Mr. Garber joined the company in 1915. As president of Harbison-Walker, Mr. Garber will also become president of Northwest Magnesite Co. and Louthan Mfg. Co., subsidiaries of Harbison-Walker.

—o—

Dr. R. F. Miller, development engineer in stainless and alloy steels, research and technology department, Carnegie-Illinois Steel Corp., Pittsburgh, subsidiary, U. S. Steel Corp., has been appointed assistant to vice president of that department.

—o—

Alfred W. Ward has been elected chairman of the board, Brooks Oil Co., Cleveland, and **Fred H. McCurdy** has been elected president and a director of the company. **W. Morrison** has been elected as vice president and a director, and **Joseph A. Rigby,** as manager of engineering and sales. Mr. Ward has been associated with Brooks Oil since 1920, and president of the company since 1940. As president, Mr. Ward succeeded his father, **A. M. Ward,** who served for 44 years in that capacity. Mr. McCurdy joined the company in 1932. He initiated the Industrial Division, and has served as manager of that division and as vice president and director of the company.

—o—

Torsten H. Parke, Bransford W. Crenshaw and **Herbert F. Blattner,** formerly sales representatives, Scul-

It costs $.027 to use these...

This figure represents the average price of 6 threaded nuts and 6 lock washers, plus the assembly cost required to install them.

It costs $.017 to use these...

Flat Type C7000 SPEED NUTS* cost less than threaded nuts plus lock washers. And the assembly cost is much lower because SPEED NUTS eliminate two operations—applying lock washers and handling wrench.

NOTE: Figures based on findings of an independent cost analysis organization.

In these days of ever-increasing production costs, saving even a fraction-of-a-cent per fastener is important. This fact has led thousands of manufacturers in the automotive, aircraft, appliance, electrical, and other industries to switch to the SPEED NUT brand of fasteners. Typical cost reports reveal assembly savings of 25% to 35% . . . and even more.

It will pay you to have Tinnerman engineers conduct fastening analyses of your products. Ask your local SPEED NUT representative about this service. Or write us for information and your copy of the new SPEED NUT bulletin. TINNERMAN PRODUCTS, INC., 2038 Fulton Road, Cleveland 13, Ohio.

In Canada: Dominion Fasteners Limited, Hamilton • *In England:* Simmonds Aerocessories, Ltd., Treforest • *In France:* Aerocessoires Simmonds, S.A., Paris

TINNERMAN *Speed Nuts*

*Trade Mark Reg. U. S. Pat. Off.

FASTEST THING IN FASTENINGS — MORE THAN 4000 SHAPES AND SIZES

lin Steel Co., St. Louis, have been elected to the office of assistant vice president. Mr. Parke is in charge of New York office; Mr. Crenshaw, who at the present time is in the St. Louis office, will transfer to the Chicago office in the near future, and Mr. Blattner will remain in the St. Louis office.

—o—

R. J. Hartung has been promoted to controller, Radio Tube Division, Sylvania Electric Products Inc., Emporium, Pa. He formerly was assistant controller, and succeeds **J. C. Farley,** recently appointed general manager, Radio Division.

—o—

J. E. Carter, federal tax counsel, B. F. Goodrich Co., Akron, has been named assistant secretary.

—o—

Claude S. Gordon Co., Chicago, has appointed **Lloyd J. Bohan** as representative for its complete line in the Los Angeles area. He has had a wide experience in the metallurgical field, and was formerly secretary, Chicago Chapter, American Society for Metals.

—o—

National Iron Co., Duluth, Minn., announces retirement of **W. C. Hanson,** formerly president and director, and **Hjalmer Hallgren,** formerly vice president and director, from the company management, and announces the following elections: **Carl Erickson,** president and general manager; **Lewis C. Erickson,** vice president and chief engineer; **Lester E. Erickson,** vice president and general superintendent; and **Charles Eisenberg,** secretary and treasurer.

—o—

William H. Jones has been appointed exclusive representative in the eastern Pennsylvania and New Jersey territory for Lovejoy Tool Co. Inc., Springfield, Vt.

—o—

Irvington Varnish & Insulator Co., Irvington, N. J., announces the appointment of **Willis J. Stillwell** as vice president of the firm, and **Robert E. Jones** as vice president and general manager of its Cap Seal Division. Mr. Stillwell joined the company in 1942 as manager, reports analysis department. He later became general auditor, and in 1945 was made assistant to the president. Mr. Jones joined the company in 1934, and became assistant treasurer in 1940. In 1941 he joined the U. S. Army Air Forces, and upon release in 1945 returned to the Irvington company. **John W. Apgar,** who has been sales manager of the Coating Division of the company, has been made assistant to the general manager of the division. **Donald May,** who held the post of sales service manager of this division, succeeds Mr. Apgar as division sales manager.

—o—

Charles L. Cooper has been appointed purchasing agent for several Alabama subsidiaries of Ingalls Shipbuilding Corp., Birmingham. Mr. Cooper, who has been with Ingalls for several years as a buyer and assistant purchasing agent, will handle purchasing for Ingalls Iron Works Co.'s two Birmingham plants; Steel Construction Co., Birmingham; and Ingalls Shipbuilding Corp.'s Tennessee River yard at Decatur, Ala. In addition he will handle steel purchases for the Pascagoula, Miss., yard of Ingalls Shipbuilding Corp.

—o—

United States Electrical Tool Co., Cincinnati, announces the following appointments as distributors in these areas: In California, Arizona and Nevada: **A. W. Helebush** and **William Greer,** both with headquarters in San Francisco. In Michigan and the Toledo, O., area: **H. D. Wixson,** with headquarters in Detroit. In metropolitan New York, **William Duff Shapiro,** with headquarters in New York.

—o—

Robert L. Hanson has been engaged as manager of the Pittsburgh district office, Allen-Bradley Co. He has had previous experience with Wagner Electric Corp., Crocker-Wheeler Co., and Sperry Corp. In co-operation with **A. F. Landergott,** assistant district manager, Mr. Hanson will cover the Pittsburgh industrial area for Allen-Bradley motor controls of all types.

—o—

Milton C. Carlson has been appointed to the post of assistant sales manager, Signode Steel Strapping Co., Chicago. Associated with the company since 1939, he has successively held positions as representative with headquarters in Davenport, Iowa, district sales manager at St. Louis, and in 1943 was advanced to Chicago district sales manager.

—o—

Russell C. Fancher has been appointed sales representative in the Detroit area for U. S. Stoneware Co., Akron. He will work out of the newly opened office at 6432 Cass Ave. Prior to his 1943 enlistment in the U. S. Army, Mr. Fancher worked for several manufacturing organizations in Detroit, both in chemical and metal finishing fields. Following his discharge from the Army, he joined the sales organization of Eaton Chemical & Dyestuff Co., Detroit. He specialized in sales and service of metal finishing processes and chemicals, particularly bright nickel and color-anodizing.

—o—

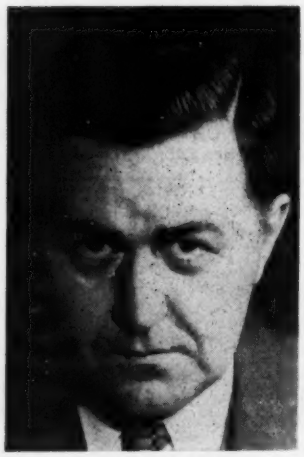
W. Howard Minton has been appointed as a direct factory representative for the Gulf Coast area, Macwhyte Co., Kenosha, Wis. He will have headquarters in Houston, Tex.

—o—

Commonwealth Engineering Co. of Ohio, research organization with laboratories at Dayton, O., announces appointment of **Malvern J. Hiler** as vice president in charge of customer relations. For the past two years he has been director of research and chemical development, Stepan Chemical Co., Chicago, and previously had been associated with Sharples Chemicals Inc., first in the company's research laboratories, Wyandotte, Mich., and later as district manager of the Chicago office.

—o—

Walter C. Hemingway has been elected president, Pittsburgh Steamship Co., subsidiary, U. S. Steel Corp., at Cleveland. He succeeds the late



ROBERT L. HANSON

MALVERN J. HILER

A BUYING GUIDE FOR ABRASIVES

ABRASIVE PROBLEM:
How does Grinding and Sanding Efficiency continue to improve?

ANSWER BY
CARBORUNDUM
TRADE MARK

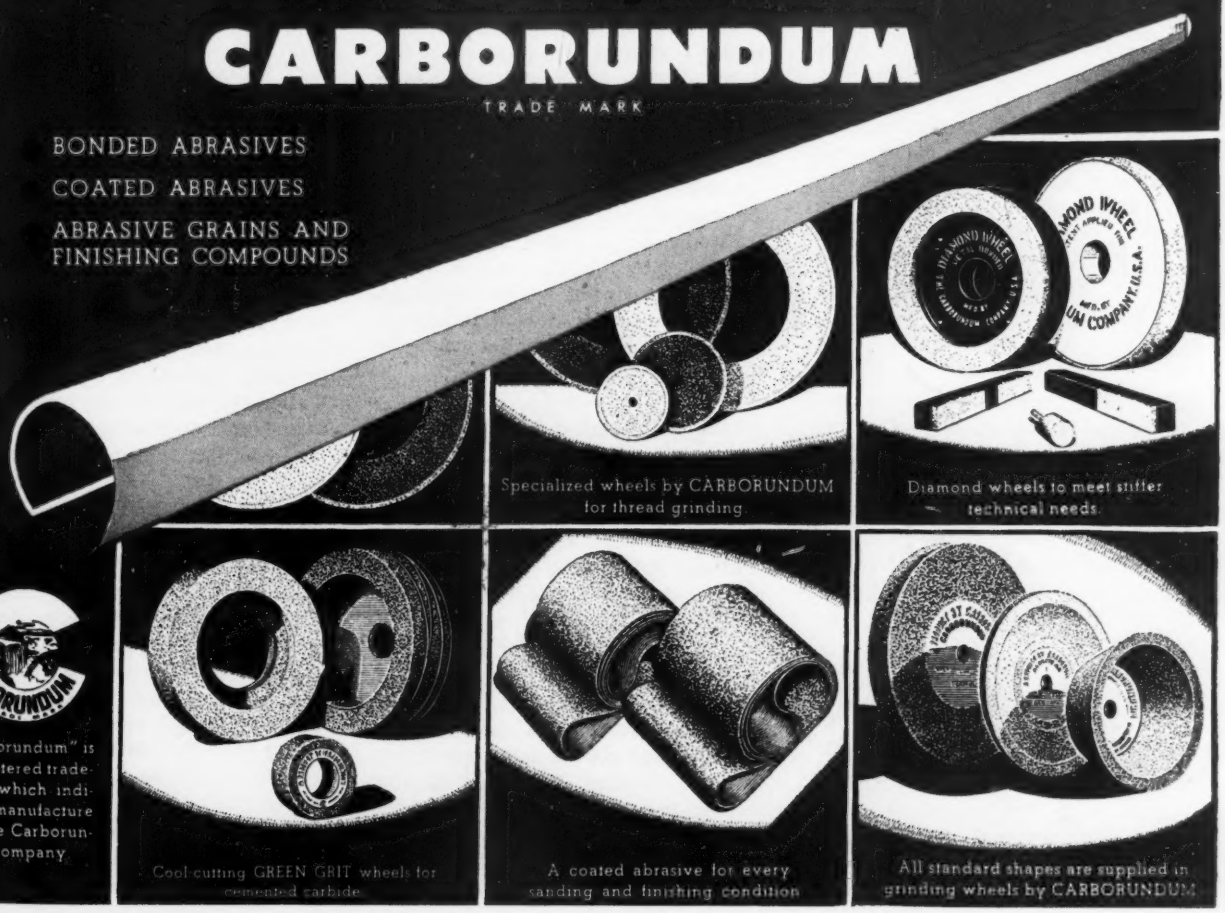
Through a continuing program of research, The Carborundum Company is constantly developing uniform abrasive products. Products that cut faster and cooler, last longer, improve finish and in other ways add to grinding and sanding efficiency.

Accomplishments of this program are well known. To the users of abrasive products they are assurance that abrasives by CARBORUNDUM are in the forefront of technical progress. It is for this reason so many manufacturers, noted for production efficiency, prefer abrasives by CARBORUNDUM. The Carborundum Company, Niagara Falls, New York.

A Good Rule for Good Grinding...CALL IN

CARBORUNDUM
TRADE MARK

BONDED ABRASIVES
COATED ABRASIVES
ABRASIVE GRAINS AND FINISHING COMPOUNDS



Specialized wheels by CARBORUNDUM for thread grinding

Diamond wheels to meet stiffer technical needs

"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company

Cool-cutting GREEN GRIT wheels for cemented carbide

A coated abrasive for every sanding and finishing condition

All standard shapes are supplied in grinding wheels by CARBORUNDUM

A. H. Ferbert. Mr. Hemingway, who has been vice president and general manager of the Federal Shipbuilding & Dry Dock Co., will assume his new duties on June 15, 1948. His entire business career has been with U. S. Steel Corp., starting in 1909 with American Bridge Co., progressing through various engineering positions to field engineering work with this U. S. Steel subsidiary in the United States and abroad. When U. S. Steel began building the Kearny, N. J., shipyards in 1917, Mr. Hemingway was assigned to duties relating to construction. Following completion of the yards, he remained in an operating capacity, and in 1927 was advanced to vice president and general manager.

—o—

Dr. James T. MacKenzie, technical director, American Cast Iron Pipe Co., has been elected chairman, Birmingham Chapter, American Foundrymen's Association. **C. P. Caldwell,** president, Caldwell Foundry & Machine Co., has been elected vice chairman, and **Fred K. Brown,** sales manager, Adams, Rowe & Norman, was re-elected secretary and treasurer.

—o—

George Squibb, who was appointed chief engineer of the Detroit Broach Co., Detroit, effective June 1, previously was associated with the Cincinnati Milling Machine Co, Cincinnati. He joined the latter company in 1935 following graduation from the University of Michigan. During the first two and a half years with the company, he worked in the foundry, machine shop, assembly department and then in demonstration work. He then was transferred to the Grinding Division of the Engineering Service Department. Two years later, he was placed in the Mill & Broaching Division, where he has specialized in broaching for the past ten years.

—o—

Two new sales representatives have been added to the sales staff of the Sapphire Products Division, Elgin National Watch Co., Chicago: **Harold H. Martin** has been appointed district representative for Wisconsin, and **Chris Wagner** will represent the company in the southern California area. Mr. Martin previously had been field engineer, Sheffield Corp., at Dayton, O. Mr. Wagner was formerly camera shop foreman for Berndt Bach Corp., Hollywood, Calif., and head of the mechanical research department, Frank Rieber Inc., West Los Angeles.

—o—

Three new regional managers appointed by Square D Co., Chicago, are: **S. T. Walz,** who will manage the Southeastern region, with headquarters in Atlanta, and who was district office manager at Birmingham; **K. R. Morris,** former Baltimore office manager, who will manage the Eastern region, with headquarters at Baltimore; and **R. W. Thompson,** who will manage the Midwestern region, with headquarters at St. Louis. He formerly was Chicago district office manager.

—o—

James H. Flagg has been appointed district sales manager, Philadelphia, for Mercer Tube & Mfg. Co., Sharon, Pa. He formerly was in the home office at Sharon.

—o—

M. K. Schnurr has been elected a director, vice president and treasurer, Stainless Products Inc., Elizabeth, N. J. He formerly was a vice president of Bridgeport Brass Co., and secretary-treasurer of Rustless Iron & Steel Corp.

—o—

John J. Boland has been promoted to chief application engineer for Meyer Furnace Co., Peoria, Ill. He was previously employed by Inland Mfg. Co., at Dayton, O., and associated with the Meyer Furnace Co. since 1947.

—o—

J. Wesley George has been appointed advertising and sales promotion manager, Automatic Washer Co., Newton, Iowa. He formerly held a similar post with Lennox Furnace Co., Marshalltown, Iowa, and was advertising specialty manager, Wendt-Sonis Co., Hannibal, Mo.

—o—

Addition of two representatives to the sales force, Moore Division, Conlon-Moore Corp., Joliet, Ill., has been announced by the company. **A. J. Lee** has been assigned to Pennsylvania, and **C. George Henderson** to eastern Ohio and the lower peninsula of Michigan.

—o—

John E. Neumann has been named manager, eastern division, Barlow & Seelig Mfg. Co., Simplex Division, Algonquin, Ill.

—o—

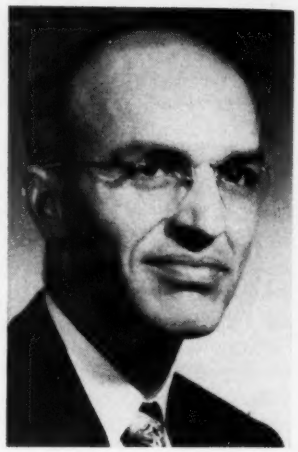
Russel J. Aurentz has been appointed district manager, and **John F. McGoey,** assistant district manager at Reading, Pa., for Luria Bros. & Co. Inc.

—o—

Charles W. Mackett has been appointed manager of sales operations, Hewitt Rubber Division, Hewitt-Robins Inc., Buffalo.

—o—

Parker H. Ericksen has been appointed director of sales, Bendix



ROBERT H. NORRIS

Home Appliances Inc., South Bend, Ind. He succeeds **W. F. Linville,** recently resigned. Mr. Ericksen served as advertising and sales promotion manager for the company from 1938 to 1943, and has been vice president in charge of sales for Majestic Radio & Television Corp., since 1943, and president of Majestic Records Inc.

—o—

Robert H. Norris, treasurer, Dearborn Stove Co., Dallas, Tex., has been elected vice president and general manager of the company. In addition to his new duties, Mr. Norris will continue to function as treasurer. Associated with Dearborn Stove Co. for three years, he entered the company in the capacity of controller at the time that Dearborn acquired its present Dallas factory facilities and moved a major portion of its operations from its Chicago plant. He was elected treasurer in 1947.

—o—

Food Machinery Corp., San Jose, Calif., announces that **Hubert L. Byrd,** former manager, Florida Division at Lakeland, has been appointed manager of the John Bean Division at Lansing, Mich. **Howard L. Shannon,** formerly assistant manager, Bean-Cutler Division at San Jose, has been transferred to Florida as manager of the Florida Division. **G. C. Jones,** staff assistant, Anderson-Barngrover Division at San Jose, has assumed the duties of assistant manager, Bean-Cutler Division.

—o—

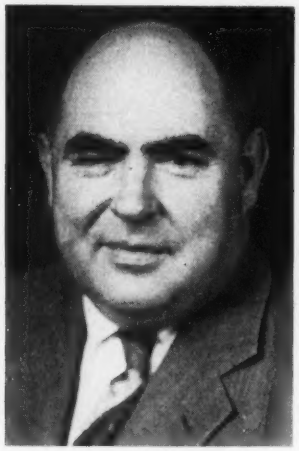
S. A. Seckler has been appointed assistant district sales manager, Republic Steel Corp. at Chicago. He has been connected with that office since 1935, and recently has been in charge of the Milwaukee office, a sub-office of the Chicago sales district.

—o—

Kenneth H. Holmgren has been appointed sales manager, Herndon Sales

J. DOUGLAS DARBY

Elected vice president in charge of sales, Carnegie-Illinois Steel Corp. Noted in STEEL, June 7 issue, p. 65



E. G. PATZKOWSKY

Appointed manager, Automatic Transmission Division, Packard Motor Car Co., Detroit. Noted in STEEL, June 7 issue, p. 78

WILLIAM H. TAYLOR

Appointed director of engineering for Tinnerman Products Inc., Cleveland. Noted in STEEL, May 31 issue, p. 48

& Service Co., Chicago, and will have charge of all activities of the Timken automatic coal-burning equipment, of which the Herndon organization is the Chicago area distributor. The Timken Co., Detroit, purchased the stoker business of Link-Belt Co. a few months ago and recently concluded a distributor arrangement for the Chicago district with **F. H. Herndon** and his associates, all of whom were formerly connected with the stoker activities of the Link-Belt Co., Chicago. Mr. Holmgren previously served as regional sales manager in Chicago for Airquipment Co., subsidiary of Lockheed Aircraft Corp.

—o—

Harlan G. Pingrey has been appointed sales promotion manager, Thor Corp., Chicago, producer of home appliances. He formerly had been advertising manager, South Wind Heater Division, Stewart-Warner Corp.

—o—

William I. Ong, public relations director, American Steel & Wire Co., subsidiary of U. S. Steel Corp., has been appointed chairman of the 1948 Cleveland Community Chest campaign, Oct. 18 to 28.

—o—

Harrington & King Perforating Co., Chicago, announces the retirement of **J. M. Fuller** as president after 62 years' service with the company. **Foye P. Hutchinson** has been elected president, **Judson E. Fuller,** vice president and treasurer, and **S. Harrington Jr.,** secretary.

—o—

Sid Langston and **Jim Parks,** well known in the Cleveland territory, are now operating as the Langston & Parks Machinery Co., representing Moore Special Tool Co. Inc., manufacturer of Moore jig borers and the Moore jig grinders; Swedish Gage Co., manufacturer of standard and special gages; and Majestic Tool & Mfg. Co., manufacturer of Parker spindles, Parker-Majestic surface grinder, internal and external grinder, and rotary grinder. Mr. Langston and Mr. Parks are still located in the Penton Bldg., Cleveland.

—o—

Henry E. Schaefer, for many years manager, Oil Country Sales Division, Wheeling Steel Corp., Wheeling, W. Va., has retired after 46 years with the corporation. He began work as a clerk in 1902 at the LaBelle Iron Works in Steubenville, O., now the Steubenville Works of Wheeling Steel.

OBITUARIES...

William C. Carr, 80, founder of the Automatic Transportation Co. in 1906, died May 27 at his home in Alexandria, Va. A pioneer in the materials handling industry, Mr. Carr established the Automatic company in Buffalo, in 1928 selling the firm which is now the Automatic Transportation Co., Chicago, a division of Yale & Towne Mfg. Co.

—o—

Frank M. Gentner, 78, who served in executive capacities with Brown Hoisting & Conveying Machinery Co. and its successor, Industrial Brownhoist Corp., died recently at his home in Cleveland. Mr. Gentner retired in the early 1930s, after 37 years with the organization.

—o—

Elliott R. Jones, 48, superintendent, Lumen Bearing Co. plant at Buffalo, and former chairman of the Western New York Chapter, American Foundrymen's Association, died June 6.

—o—

George B. Miller, 63, vice president, Loeffelholz Co., Milwaukee, died June 5 following a heart attack.

—o—

C. M. Ballou, 62, former Cleveland traction commissioner, died June 8. Before his appointment Mr. Ballou had been manager, American Sheet & Tin Plate Co., Cleveland, and had previously been in the steel business in Monessen, Pa.

—o—

Clarence E. Weed, 48, manager, price bureau, Stamford, Conn., Division, Yale & Towne Mfg. Co. since 1930, died June 7 at his home, Darien, Conn.

—o—

William Herdenbergh Jr., 58, former foreign sales manager, New Jersey Zinc Co., New York, died June 5, at Morristown, N. J., following injuries suffered in an automobile accident.

—o—

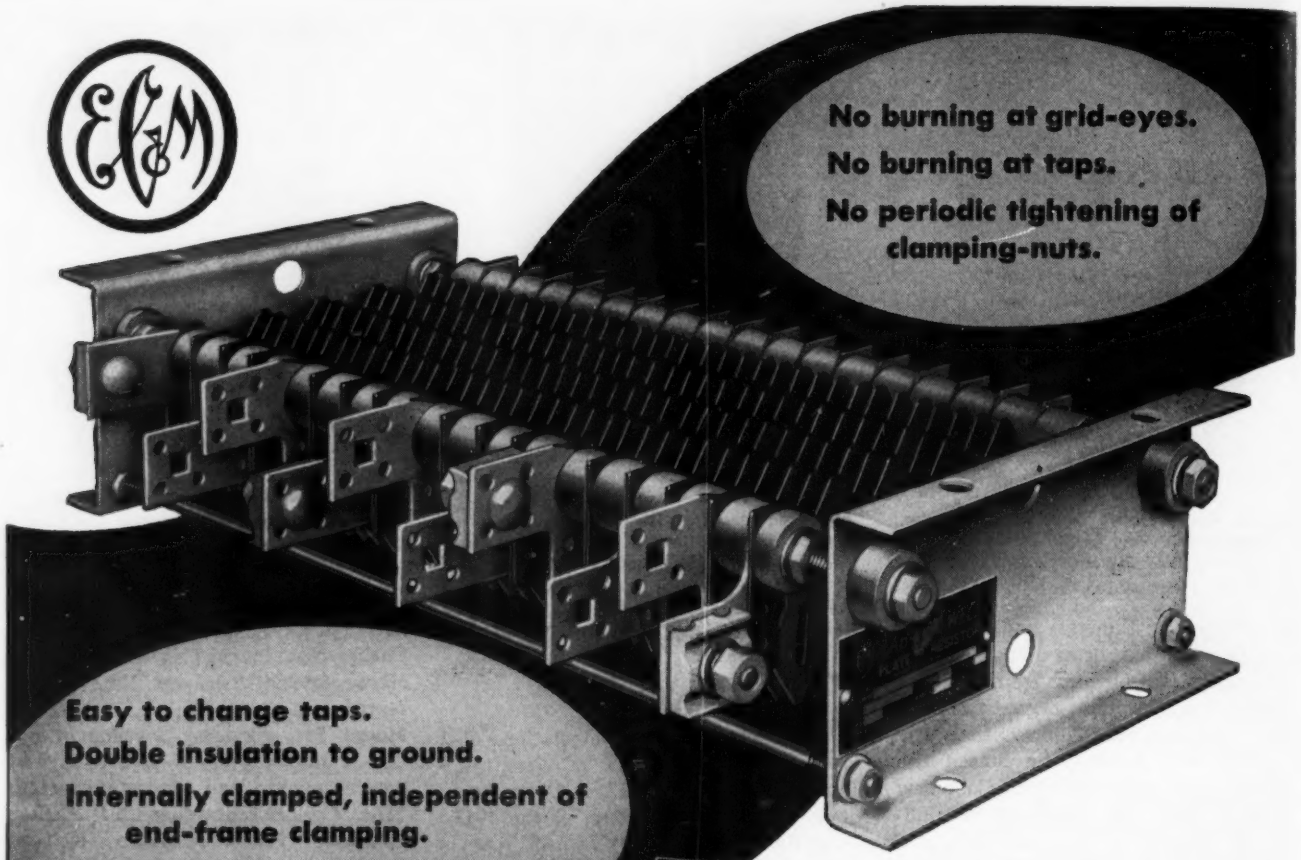
Howard H. Craver, 72, manager, chemical department, Pittsburgh Testing Laboratory, died June 6 after a short illness. He had been associated with the laboratory for 50 years.

—o—

William J. Weaver, 61, president, Ansonia Division, Noma Electric Corp., New York, manufacturer of insulated wire and cable, died June 5, at Woodbridge, Conn.

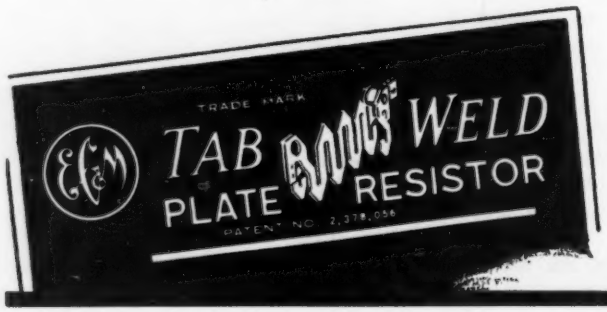
—o—

Joseph L. Hecht, 80, retired chief, French & Hecht Inc., Davenport, Iowa, metal wheel manufacturer, died June 3 after a long illness. French & Hecht is now a division of Kelsey-Hayes Wheel Co.


No burning at grid-eyes.
No burning at taps.
No periodic tightening of clamping-nuts.
Easy to change taps.
Double insulation to ground.
Internally clamped, independent of end-frame clamping.
Available in capacities up to 150-amperes without paralleling.

TAB-WELD RESISTORS REDUCE MAINTENANCE COSTS

Resistors used in electrical control service are usually mounted in out-of-the-way places. Because they are difficult to get at, periodic inspection is often neglected until trouble develops. Then, the mere tightening-up of bolts is frequently too late. Sections must be completely gone over, even torn down to repair the damage in concealed areas. *EC&M TAB-WELD Resistors eliminate this expense.* Tap-plates are welded in place, affording a *rigid terminal* for connecting external wires. These plates, located at frequent intervals, make it easy to shift taps. The spot-welding of mated ends of adjacent resistors keeps the resistance value constant. Reduce maintenance costs with TAB-WELD Resistors.



SPECIFY EC&M Bulletin 942
TAB-WELD Resistors.

THE ELECTRIC CONTROLLER & MFG. CO.

2698 East 79th Street • Cleveland 4, Ohio

Engineering News . . . AT A GLANCE

ROOM FOR MORE IMPROVEMENT— Although many thousands of dollars worth of castings are rejected upon the basis of x-ray examination, actual strength tests performed on typical rejects show them to be well within minimum strength requirements. According to T. P. Nordin, research engineer, Battelle Memorial Institute, Columbus, O., such a situation demonstrates that existing testing and inspection techniques are open to improvement—that this inadequacy serves as a stimulant for developing new test methods and feet-on-the-ground interpretation.

SYNCHRONIZED CONTROL—Stainless steel strip is annealed to extremely close tolerances in a 3-zone Tate Jones continuous annealing furnace in the plant of Washington Steel Corp., Washington, Pa. So critical are temperature limits that each zone—preheat, soak and cooling—is regulated by a separate controller, which accurately and continuously proportions fuel supply to heat demand. As a final check on these "teamed up" controls, temperature of the strip leaving the furnace is recorded by a round chart Micromax pyrometer. Precise control thus obtained is reported to assure high production and uniform quality of steel.

ROPE TECHNIQUE THAT WORKS— To speed up charging in the foundry of Electro-Alloys Division of American Brake Shoe Co., Elyria, O., an orange-peel type bucket loaded with the charge is lowered by crane into the top of the hot furnace, roof of which is swung to one side. An ordinary rope holds the bucket door closed. This rope burns away in a few seconds in the intense heat of the furnace, and the charge drops inside. The roof then is swung back into position and a new melt is on.

SPEEDS UP CHARGING— Successful use of lightweight insulating firebrick for the first time in a large 57½-foot rotary hearth furnace in the plant of Babcock & Wilcox Tube Co., Beaver Falls, Pa., was reported recently. The brick, according to the company, not only provides fuel economies, but also enables the furnace—after weekend shutdowns—to be brought up to temperature for charging steel within 1½ hours compared to the 8-hour period previously needed when using heavy firebrick. Operating data on this and other smaller installations indicate that a rotary hearth furnace lined with lightweight brick, which is shut down every night and started again in the morning, can be operated as economically as a furnace with heavy brick operating 24 hours per day. At B & W the furnace is used to heat billets for piercing in the process of making seamless tubing.

TESTING TIME "FRACTIONALIZED"—Tests of ordnance materiel, to determine its functioning and improve its accuracy and reliability, now can be accomplished in fractions of the time and expense, and with much higher degree of precision than formerly possible in the new stratospheric facility recently dedicated by the Army at Aberdeen Proving Ground, Md. Effect of extremely low temperatures on metals, fuels, lubricants and automotive parts can be determined in a section of this facility which is capable of producing a temperature of 110° below zero. The huge firing chamber can simulate both changes in temperature and atmospheric pressure occasioned by the fastest aircraft in testing weapons as large as 105 mm cannon.

EFFECTIVE YARDSTICK — When substituting alloy steels, the hardenability factor is still the main tool of the metallurgist. According to A. S. Jameson, assistant manager of metallurgy, International Harvester Co., Chicago, there are two approaches in making hardenability comparisons—one on the basis of carbon content and another on the basis of alloy content. There also are two distinct steel grade classifications predicated on method of fabrication, or rather on end mechanical property requirements. These are the carburizing and the medium carbon grades. (p. 88)

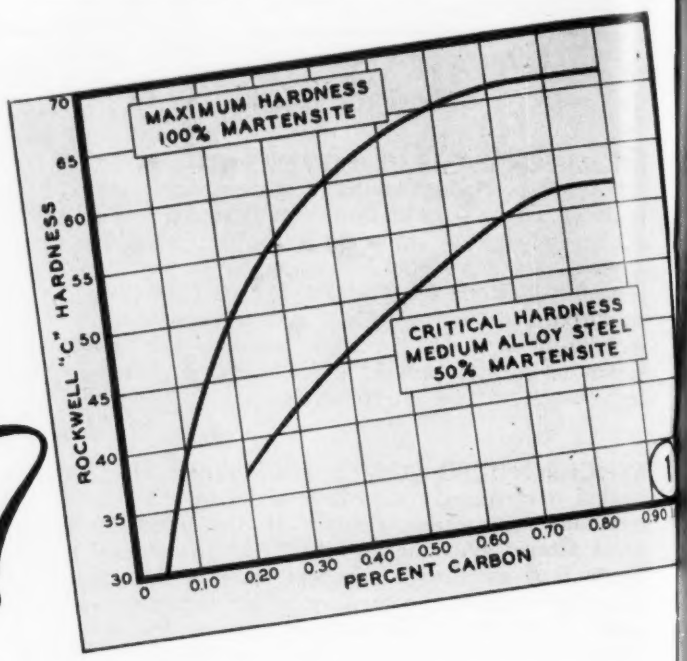
POKE SPOTWELDING—One of the newest methods to come into use in the automotive industry is poke spotwelding. It is a method employing a lightweight gun, a fixed electrode, a device for cooling the latter, and a means for surrounding the weld with argon gas. In making a weld, the operator pushes the gun against the surface to be welded, opens a valve that starts the gas flowing and closes a switch in the handle of the gun causing a high-frequency current to flow from the electrode to the work. The method, primarily developed for use where portable welders could not be applied, is employed for boxed-in sections. (p. 93)

ADHERENCE BOOSTER—Bond or adherence of organic coatings is usually improved by the preapplication of protective coatings on zinc-base die castings produced by converting the metal surface into a chemical compound of exceedingly low solubility, according to many authorities. Another important function of such chemical conversion coatings is to inhibit the spread of corrosion when finishes are scratched through or chipped. Commercially available today are several such chemical treatments. (p. 96)

"POUNDS OF CURE"—Main function of the new Bethlehem Steel Co. industrial hygiene lab is to detect and evaluate health hazards and sources of discomfort which may exist throughout the plant, and to assist in development of proper corrective measures that lead to eradication of such conditions or keep them within safe and unobjectionable bounds. While the medical staff deals largely with the worker, personnel of the hygiene division are concerned mainly with his environment. (p. 110)

Can You Use

Lower Priced Alloy Steels?



Application possibilities of the more economical alloy compositions such as the 1300, 4000, 4100, 5000, 5100, 9200 and 9400 series should not be overlooked, especially since it is recognized that most alloy steels, when treated to produce the same mechanical properties, have comparable service records

AS ALL steel users should know, the first cost of the steel is not the whole story, for certain alloy compositions may cost more to process although they are originally more reasonably priced. It may not be possible to heat treat them to produce the physical characteristics which make them suitable for more exacting requirements in finished parts.

There is no reason why the possibilities of the lower priced alloy compositions such as the 1300, 4000, 4100, 5000, 5100, 9200, 9400 series cannot be explored especially as it is becoming well known that most alloy steels, when treated to produce the same mechanical properties have comparable service records.

Certain steels have been deleted from the AISI standard steels list and inasmuch as there is a price extra assessed for nonstandard steels it may be found that it would be advisable to replace these with a standard listed steel.

Table I is a list of alloy steels which can be classified as the carburizing grades. For clearer presentation the 8600 series steels are used as a basis for comparison. Steels of the same carbon content are arranged reading from left to right in order of increasing cost, and the table is divided on the basis of whether the steel compositions are less or more costly than steels of the 8600 series. Table II is a list of the medium carbon alloy steels.

Substitutions Based on Hardenability — Substitutions cannot be made on the basis of similar carbon content except in a very general way. The simple process of reading on the same line from left to right in Tables I and II and assuming that the steel shown with same carbon is interchangeable would lead one into difficulties. A relatively sound basis for substitution is a comparison on the basis of hardenability characteristics of the steel compositions as determined by conventional hardenability tests.

This method was applied during the war years for the creation of the 8600 and the 9400 series, previously known as National Emergency steels, and for the substitution of alloy steels in general, with considerable success. Like all general rules, this one has its exceptions. These arise from the fact that alloy compositions of similar hardenability characteristics do not fabricate with the same ease, and therefore the end cost is not reflected in the first cost.

Fabrication Considerations—Primary fabrication of automotive parts is by hot forming, cold forming or machining. Hot forming or forging is a method of fabrication which presents the least difficulty; however, there are some alloy compositions which present problems in heating for forging and cooling after forging. Steels with high air hardening characteristics, such as the manganese steels (1300 series), chromium molybdenum steels (4100 series), nickel chromium molybdenum steels (4300 series), show a greater tendency to develop internal checks in heating and cooling. Hardenability as measured by the conventional tests is not apparently the whole story, for these difficulties appear even though steels have

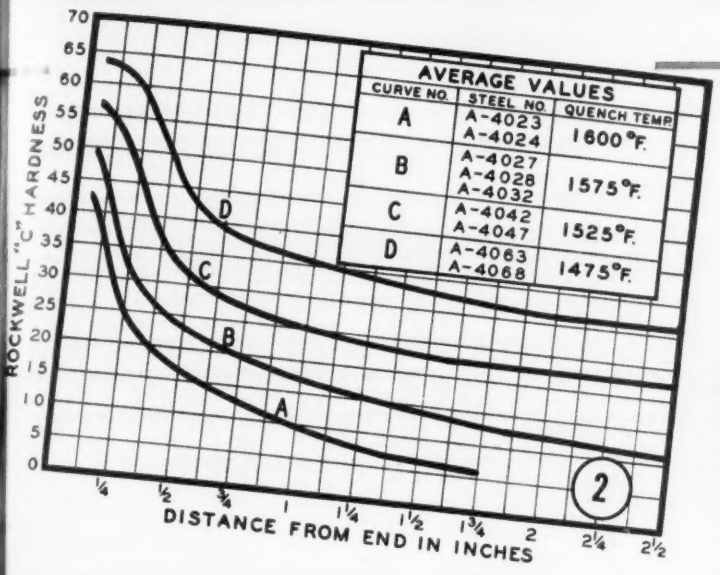

AVERAGE VALUES
CURVE NO. | STEEL NO. | QUENCH TEMP
A | A-4023 A-4024 | 1600°F.
B | A-4027 A-4028 A-4032 | 1575°F.
C | A-4042 A-4047 | 1525°F.
D | A-4063 A-4068 | 1475°F.
ROCKWELL "C" HARDNESS
DISTANCE FROM END IN INCHES
2

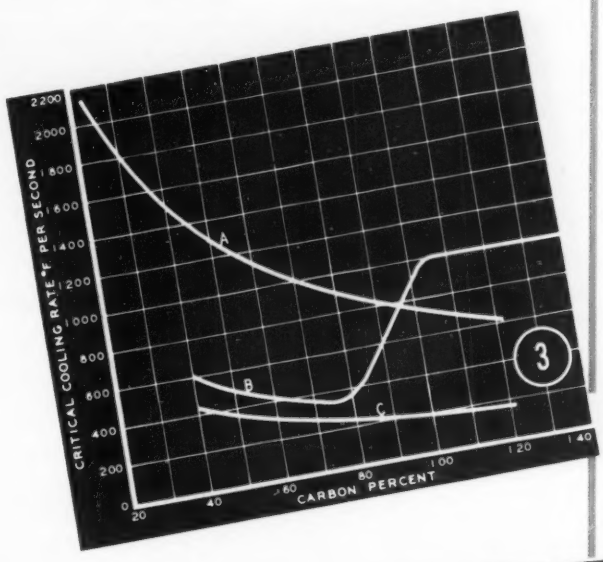
Fig. 1—Maximum hardness and critical hardness at different carbon contents

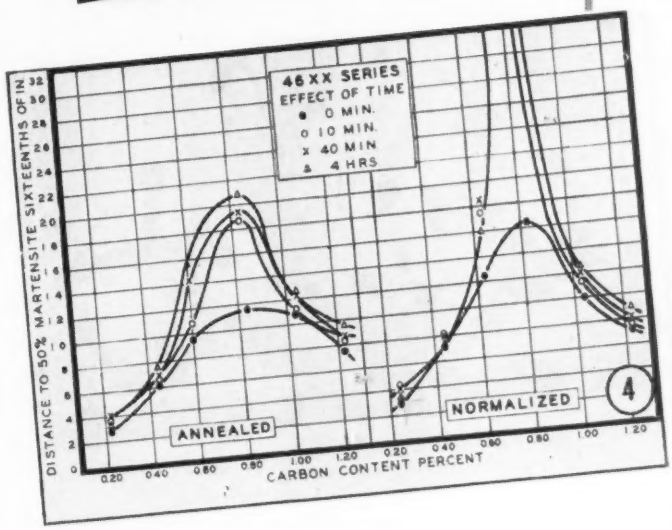
Fig. 2—Effect of carbon content on standard end-quench hardenability tests, A-4000 series. From "Contributions to the Metallurgy of Steel", No. 10, AISI

Fig. 3—Relation of critical cooling rate to carbon content of iron-carbon alloys and carbon steels. A—Iron-carbon alloys quenched from temperature (1700° F) establishing a constant austenitic grain size of 6 to 12 grains per square inch at 100 diameters (ASTM grain No. 14). B—Carbon steels quenched from recommended hardening temperatures (variable austenitic grain size, all carbon not in solution in the hypereutectoid steels). C—Carbon steels quenched from varying temperatures establishing a constant austenitic grain size with all carbon in solution 6 to 12 grains per square inch at 100 diameters (ASTM grain No. 14). By Thomas G. Digges, from Journal of Research, National Bureau of Standards, Vol. 20

Fig. 4—Effect of carbon content on hardenability of 46XX series as influenced by time at 1550° F. By Rowland, Welchner, Hill and Russ, Transactions of ASM, Vol. 35

By A. S. JAMESON
Assistant Manager of Metallurgy
International Harvester Co.
Chicago





the same hardenability ratings.

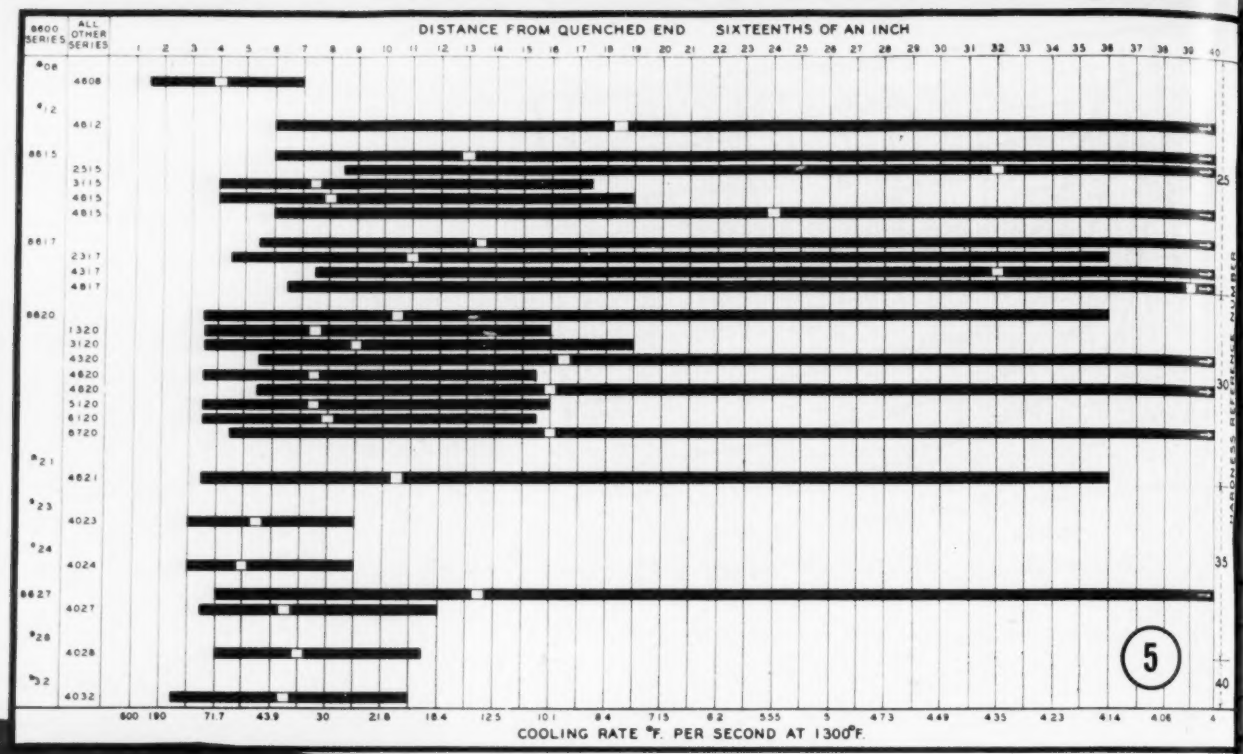
Regardless of hardenability similarities, in cold forming operations, such as cold heading, it is not out of the way to state that the lower the alloy content the better is the ability of the steel to cold form. For example, a molybdenum steel such as 4042 will cold head much more easily than a nickel chromium steel or a nickel chromium molybdenum steel of similar carbon content. Hardenability comparisons may result in the use of a higher carbon steel than was formerly used, and a higher carbon content steel is more difficult to cold form.

Machining may be a primary, or the sole method of fabrication. It is also employed as a secondary operation following hot or cold forming.

Presupposing that the structures are prepared by annealing for machining, as is usually the case with alloy steels, certain alloy compositions are not so easily disposed to assume the microstructures which make for good machining. For example, 4640 nickel molybdenum steel shows a marked disposition to anneal with a spheroidized structure when a lamellar pearlite microstructure may be desired for easy machining. Nickel chromium, 4140, or nickel chromium molybdenum, 4340, or nickel molybdenum, 4820, require carefully controlled cycles for economical annealing and machining.

The molybdenum 4000 series, the manganese 1300 and the 5100 series steels are not preferred for easy machining. In this regard, it is noted that some recognition is being given to the treatment of alloy steel by resulphurization to improve machinability. Molybdenum steels 4024 and 4028 are available with sulphur contents in a range of from 0.35 to 0.050 per cent. Nickel chromium molybdenum 8640 steel is available specially treated to improve machinability.

Machinability may also be dependent on steel making practice. For example, the 1300 and 5100 series steels tend to retain abrasive inclusions if melted on the cold side. Cold drawing is universally used for improving the machinability of alloy steels and may be specified with no addition to the overall cost of the finished part.



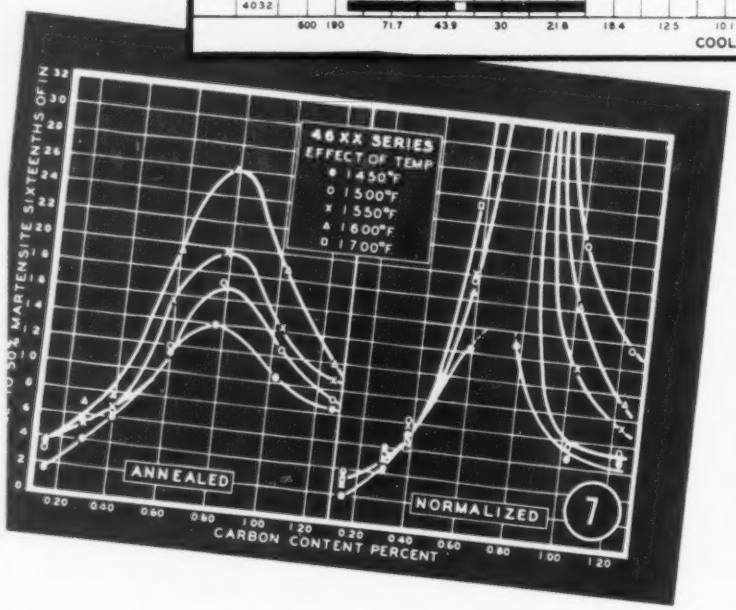


TABLE I
COMPARISON OF ALLOY STEELS BY AISI NUMBER
Equivalent Carbon Content Alloy Steel
(arranged in order of increasing cost at .20% C level)

8600	Less Expensive						More Expensive				
Series	5100	1300	4000	8700	3100	6100	4600	4300	2300	4800	2500
*08	....	....	....	....	....	....	4608	....	....	....	....
*10	....	....	....	....	....	....	....	....	....	....	....
*12	....	....	....	....	....	....	....	....	....	4812	....
8615	....	....	....	....	3115	....	4615	....	....	4815	2515
*16	....	....	....	....	....	....	....	....	....	....	....
8617	....	....	4017	....	....	....	....	4317	2317	4817	....
*19	....	....	....	8719	....	....	....	....	....	....	....
8620	5120	1320	....	8720	3120	6120	4620	4320	....	4820	....
*21	....	1321	....	....	....	....	4621	....	....	....	....
8622	....	....	....	....	....	....	....	....	....	....	....
*23	....	....	4023	....	....	....	....	....	....	....	....
*24	....	....	4024	....	....	....	....	....	....	....	....
8625	....	....	....	....	....	....	....	....	....	....	....
8627	....	....	4027	....	....	....	....	....	....	....	....
*28	....	....	4028	....	....	....	....	....	....	....	....
8632	....	....	4032	....	....	....	....	....	....	....	....

* No equivalent 8600 series steel.

Heat Treatments—Despite the shortcomings of the hardenability method as a basis for substitutions, it is a very important consideration in heat treating operations. It has been stated by some that distortion in heat treatment is a function of alloy composition. This may or may not be true, but there are some who would attribute differences in distortion to hardenability differences rather than to some inherent characteristics of an alloy composition. However, one cannot lose sight of the fact that steels containing elements which raise the Ac critical range such as chromium, and therefore require a higher hardening temperature, do tend to have greater distortion problems than do steels containing elements which lower the Ac critical range such as nickel, and make possible the use of lower hardening temperatures.

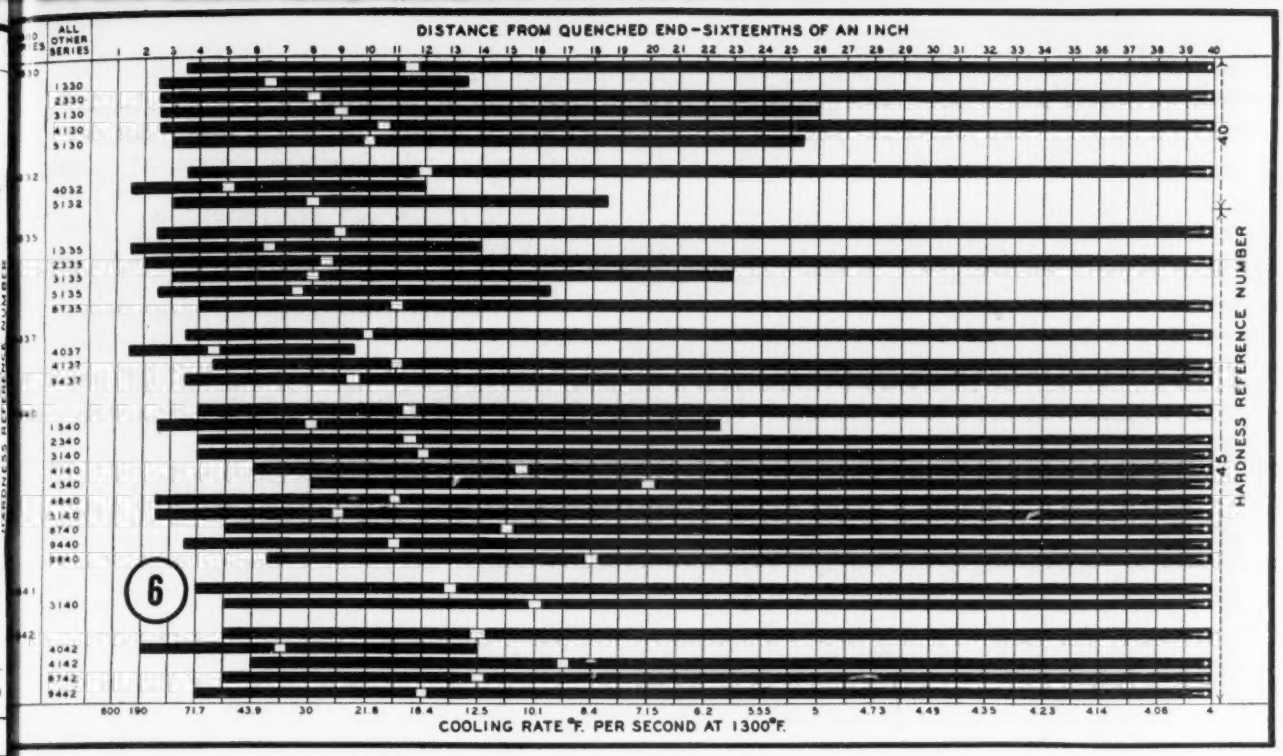
Nevertheless, alloy compositions containing manganese, chromium, and molybdenum do have great possibilities for isothermal treatment applications. Here, alloy costs may be offset by more economical heat treatment practices obviating substitutions.

Another consideration which affects heat treatment practice, aside from hardenability, is the tendency of certain alloy compositions to retain austenite after hardening. This is particularly true of nickel and nickel molybdenum steels, although high hardenability in itself is a factor in the retention of austenite. This tendency excludes the possibility of the use of a single hardening operation. Subzero treatment can remove retained austenite but the method does not appear practicable in treatment of large quantities of parts.

However, one must not lose sight of the fact that nickel, though retarding the rate of carburization, does, through its depression of the Ac range, allow carburization at lower temperatures. Thus, when single quenching from carburizing is employed, less distortion is experienced because of the lower quenching temperatures. Further, nickel has the effect of lowering the carbon content of the carburized case which is in many instances a preferred condition.

Vanadium as an alloying element can be employed to make possible economy in carburizing by retarding grain growth in long heating cycles, and result in the elimination of a double hardening treatment.

Finally, some mention should be made of avoidance of temper brittleness in heat treatment which is a



function of alloy composition. Nickel-chromium 3100 series steels are especially prone to develop temper brittleness. The inclusion of molybdenum in an alloy composition retards brittleness.

Hardenability—Hardenability is still the main tool for the substitution of alloy steels. There are two approaches to the hardenability comparisons, one on the basis of carbon content and another on the basis of alloy content. There are also two distinct steel grade classifications predicated on method of fabrication, or rather on end mechanical property requirements. These are the carburizing grades as shown in Table I, and the medium carbon grades as shown in Table II. In some respects they are best discussed separately from the point of view of hardenability although there are some general features which apply to both.

Hardenability is a word which has been used so much lately in metallurgical literature and with so many variations of meaning that it seems necessary to define one's meaning before using the word. Perhaps it should be said that steel owes its ability to harden to the presence of carbon. Fig. 1 shows the highest possible hardness obtainable for each carbon content by cooling the steel at a rate exceeding the critical cooling rate after austenitizing for complete solution of the excess constituent whether it be ferrite or cementite.

In actual production heat treating operations, the hardness obtained will be less than that indicated as the maximum hardness curve and would fall between that curve and the lower curve designated as the critical hardness, the 50 per cent martensite curve. Steels hardened by induction heating at times show hardness exceeding the maximum hardness curve. The 50 per cent martensite curve for plain carbon steels is a little lower than that for alloy steels; however, the main function of alloy additions is not one of increasing maximum obtainable hardness.

Another way of looking at hardenability is to approach it from the viewpoint of defining hardenability on a comparative basis as the ability of a steel to be cooled at a slower rate and yet produce 100 per cent martensite or 50 per cent martensite. The slower the rate of cooling which can be used to produce a certain hardness the higher the hardenability of steel.

Fig. 5—Calculated comparative hardenability of alloy steels, carburizing grades

Fig. 6—Calculated comparative hardenability of alloy steels, medium carbon grades, 30 to 42 carbon steels

Fig. 7—Effect of carbon content on hardenability of 46XX series as influenced by quenching temperatures, 40 minutes at temperature. By Rowland, Welchner, Hill and Russ, Transactions of ASM, Vol. 35

This is one of estimating hardenability on the basis of cooling rates such as employed by the most commonly used hardenability test, the Jominy-Boegehold end quench test. The function of alloys is to increase the hardenability of the steel when approached by the cooling rate point of view. Carbon also increases hardenability.

Effect of Carbon on Hardenability—Using cooling rates, a comparison of 4000 series steels on the basis of carbon content is shown in Fig. 2. This is from "Contribution of the Metallurgy of Steel", No. 10, American Iron & Steel Institute, March, 1943.

If one would take a common hardness level of 35 R"C" and apply it to Fig. 2, one would arrive at the following measure of the effectiveness of carbon.

Carbon Content	Hardenability Value J-35 in 1/16-inch
A-4023	2.5
A-4024	
A-4027	3.5
A-4028	
A-4032	
A-4042	6.5
A-4047	
A-4063	18.0
A-4068	

Thomas G. Digges[1] in the Journal of Research of

the National Bureau of Standards reported an investigation he had carried out relative to the effect of carbon on the critical cooling rate of high-purity noncarbon alloys and plain carbon steels. Abstracts from his work follow:

Experiments described were made to determine the influence of carbon on the critical cooling rate of both high-purity iron-carbon alloys and plain carbon steels. As composition and grain size of the austenite are now recognized as factors influencing the critical cooling rate or hardenability of steel, the method of preparing the alloys and steels used in the experiment was such as to eliminate the quality factor and variables other than carbon that was contained in the composition.

The alloys and steels were quenched directly from the temperatures required to establish a constant austenitic grain size with all carbon in solution. Determinations were also made to include carbon steels quenched from the usually recommended hardening temperature ranges. In these instances, the carbon content and grain size of the austenite and total carbon varied with different steels.

"For the selected conditions of constant austenitic grain size and solution of all carbon in the austenite, the critical cooling rate decreased continuously with increase in carbon for both the high-purity iron carbon alloys (Curve A) and the plain carbon steel (Curve C), Fig. 3. That is, the hypereutectoid alloys had slower critical cooling rates (were deeper hardening) than the alloys of either eutectoid or hypoeutectoid compositions and the hypereutectoid steels were deeper hardening than the steels of eutectoid and hypoeutectoid compositions.

"High purity iron carbon alloy differs from the plain carbon steels in the number of nonmetallic inclusions and amounts of manganese. Manganese in the plain carbon steels caused slower critical cooling rates (deeper hardening), on the other hand the presence of inclusions, acting as nuclei for transformation of the austenite had opposite effects (shallower hardening).

"For the carbon steels quenched from the usually recommended hardening (*Please turn to Page* 106)

TABLE II
PROPOSED SUBSTITUTIONS IN MEDIUM CARBON GRADES (OPEN HEARTH STEEL)
(Based on the assumption that 8600 series steels are in use)
COMPARISON OF ALLOY STEELS BY AISI NUMBER
Equivalent Carbon Content Alloy Steel
(arranged in order of increasing cost at .40% C level)

Carbon Content 8600	Similar or Less Expensive								More Expensive							
	5000	1300	5100	4000	9200	9400	9700	4100	8700	3100	9800	6100	4600	4300	2300	9800
8630	....	1330	5130	....	....	....	....	4130	....	3130	....	....	....	....	2330	....
8632	....	....	5132	4032	....	....	....	....	....	....	....	....	....	....	....	....
8635	....	1335	5135	....	....	....	....	....	8735	3135	....	....	....	....	2335	....
8637	....	....	....	4037	....	9437	....	4137	....	....	....	....	....	4337	....	....
8640	....	1340	5140	....	....	9440	....	4140	8740	3140	9840	....	4640	4340	2340	9840
8641	....	....	....	....	....	....	....	....	....	3141	....	....	....	....	....	....
8642	....	....	....	4042	....	9442	....	4142	8742	....	....	....	....	....	....	....
8645	5045	....	5145	....	....	9445	....	4145	8745	3145	9845	6145	....	....	2345	9845
*46	5046	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
8647	....	....	5147	4047	....	....	9747	4147	8747	....	....	....	....	....	....	....
8650	....	....	5150	....	....	....	....	4150	8750	3150	9850	6150	....	....	....	9850
*52	....	....	5152	....	....	....	....	....	....	....	....	6152	....	....	....	....
8653	....	....	....	4053	....	....	....	....	....	....	....	....	....	....	....	....
8655	....	....	....	....	9255	....	....	....	....	....	....	....	....	....	....	....
8660	....	....	....	....	9260	....	....	....	....	....	....	....	....	....	....	....
*61	....	....	....	....	9261	....	....	....	....	....	....	....	....	....	....	....
*62	....	....	....	....	9262	....	....	....	....	....	....	....	....	....	....	....
*63	....	....	....	4063	....	....	9763	....	....	....	....	....	....	....	....	....
*68	....	....	....	4068	....	....	....	....	....	....	....	....	....	....	....	....

* No equivalent 8600 series steel.

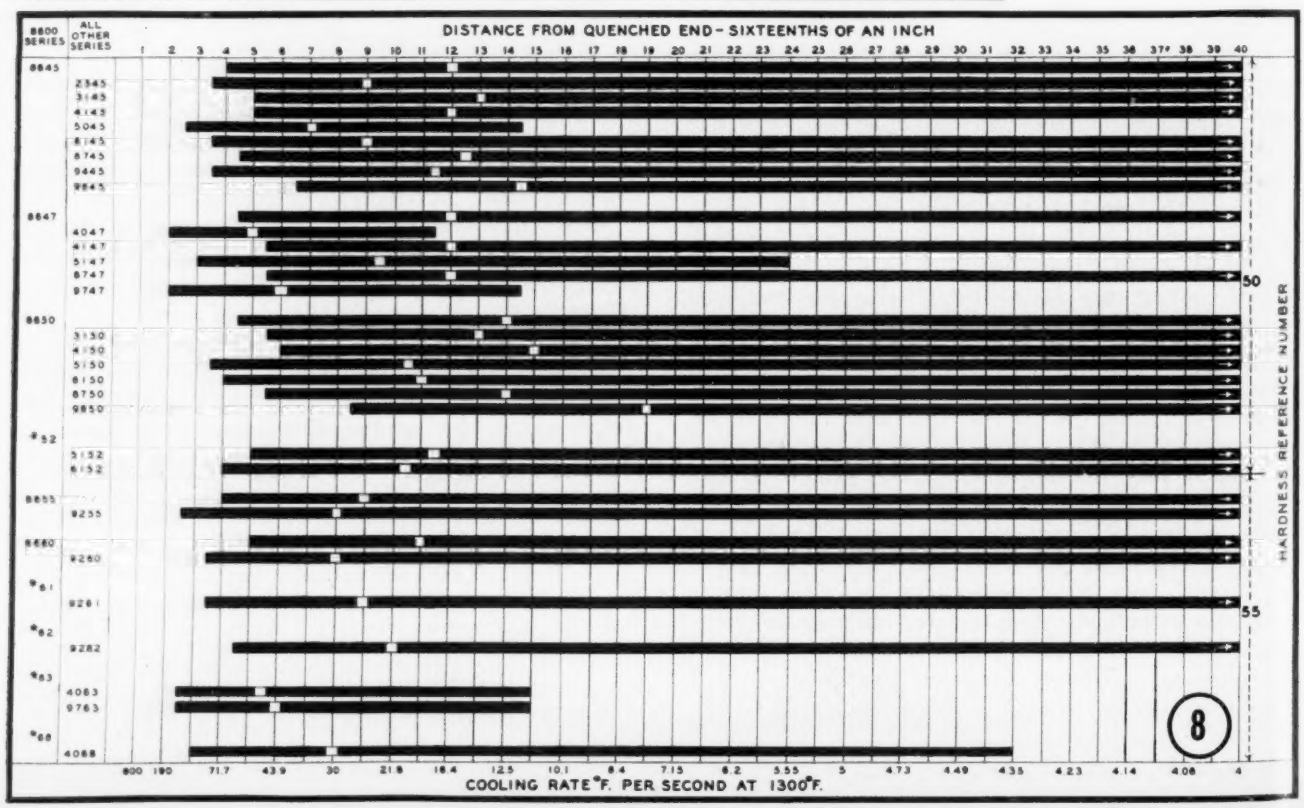


Fig. 8 — Calculated comparative hardenability of alloy steels, medium carbon grades, 45 to 68 carbon steels

Latest type welders enable all guns to contact work simultaneously, assuring alignment and resulting in considerable time savings. Poke spotwelding developed for work on boxed-in sections

Multiple Welding Procedures

Speed and Improve Quality of Motor Car Body Joints

By E. O. COURTEMANCHE
Welding Engineer
Briggs Mfg. Co.
Detroit

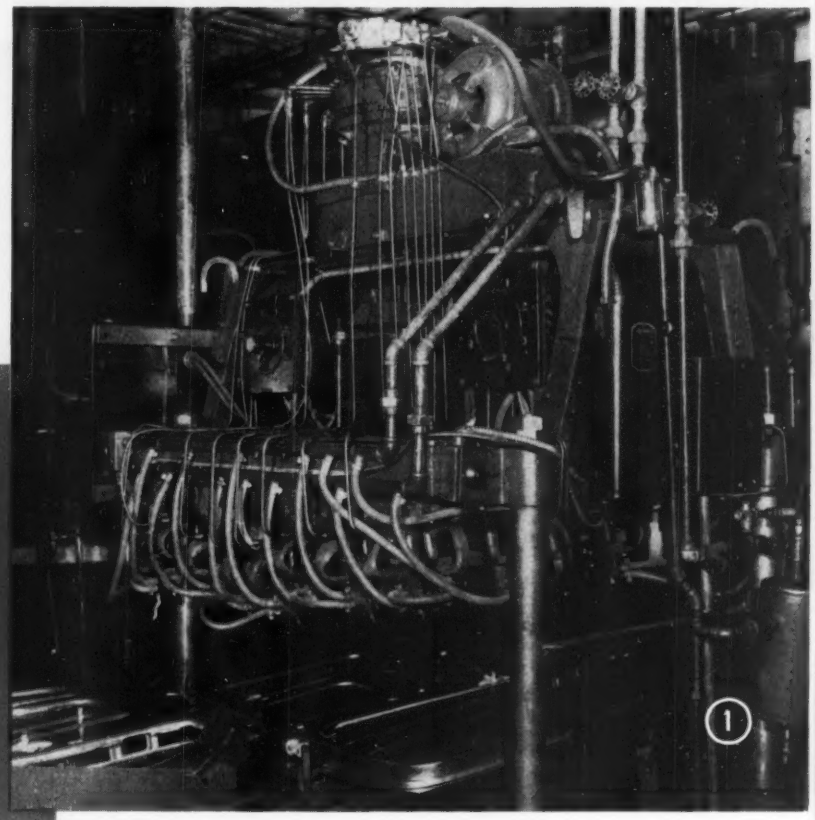


Fig. 1—Multiple spot hydromatic press adapted for welding inner and outer door panels in conjunction with clinching operation is shown with the head in raised position

WELDING has become an increasingly more important part of the manufacture of passenger car bodies. It can be estimated conservatively that 20 per cent of the production manhours in Briggs Mfg. Co. plants in Detroit and Evansville, Ind., are devoted to welding operations.

From the earliest flash or butt welders, suitable only for small parts or subassemblies, to the newest multi-transformer setups with their batteries of guns working on an entire top or underbody assembly, the trend has been to more automatic equipment and faster and better welds.

First resistance welder used in the industry was what is commonly called the pedestal welder. This machine was foot-operated and had an inferior mechanism controlling the weld time and pressure. Consequently, strength of the spotweld was determined more or less by the instinct or training of the operator as to how long the current should flow before depressing the pedal far enough to shut off the welding current and applying the forge pressure.

Today these resistance welding machines have three means of operation as follows: Motor-driven; cam-operated; air cylinder; and hydraulic cylinder. Precise methods for obtaining the correct relationship between weld time and pressure on the electrodes are used, thus assuring good welds at all times. This type of welder, today as in the past, lends itself only to the production of small subassemblies.

Projection Welder—Next step forward was the press-type welder or, as it is more commonly called, the projection welder. This welder was developed when it became apparent certain parts which required more than one spot in a comparatively small area could be produced more efficiently and at lower cost if they could be produced with one stroke of the welder instead of several strokes. This type of welder has been used successfully on parts requiring as high as 13 spots or projections and still has an important role in automobile body production on such assemblies as door handle reinforcements to door panels, door check strap brackets to pillars and similar components.

It was about 1931 when the first successful portable welder was developed. It differed from previous experimental types of portable welders by using an air cylinder to operate it instead of a hand-operated gear and rack to move the electrode to contact the work.

The machine has also incorporated correct weld time in relation to pressure on the electrodes. This important development for the first time allowed major assemblies to be built complete in their respective fixtures on a moving conveyor. It permitted fixtures to be built substantially assuring a more accurate and better built body, and increasing the number of pieces that could be built in a certain number of manhours.

Today, portable welders still have a major role in the assembling of an automobile body. One of the difficulties encountered with this type of welding is accessibility to the place where a weld is required. Design of the body is chiefly responsible for this condition. When this occurs, the electrodes on the particular welder have to be made much smaller than is normal and this results in a higher electrode cost. In the past this was not given enough thought by the body design engineers. But today this condition exists only to a small degree, as body design and welding divisions work very closely to minimize these hard-to-get-at places.

Output Improved—Approximately at the same time that portable welders were introduced, bar welding fixtures came into use, employing expansion guns to perform the welding operation. This permitted large panels such as inside and outside door panels, floor pans and their respective reinforcements to be welded much faster than with previous welding set-ups because it allowed two or more operators to work at the same time on the same fixture.

These were followed shortly by the hydromatic multi-spot welder. This machine consisted essentially of an oil-distributing valve, oil-operated welding guns, and the electrical system comprising both the secondary and primary circuits. Depending on the capacity of the valve, any number of guns from two to eight could be operated off one port. This meant that if two to eight transformers in the case of direct welding or one to four transformers in the case of series welding were used, two to eight welds could be made simultaneously from each port of the valve on the welder.

Advantages of Hydromatic — Obviously, all the parts produced on a bar welding machine could be produced on this new type of welder more economically and much faster because we now had a machine that, after being loaded and started on its cycle, could finish it automatically. This provided a definite time cycle that could be counted on to produce so many pieces per hour.

This type of welder has been constantly improved and in some instances, such as welding the inside and outside door panels after clinching, has been made to operate automatically in conjunction with the clinching press. This particular set-up is still in operation on present day production in Briggs plants, and is shown in Fig. 1, with the head in the raised position.

As the larger assemblies, such as front and rear floor pans and their reinforcements, became more complex, thereby requiring more spots, it became increasingly difficult to hold these parts in place until they were welded. This was caused mostly by the vibration set up by the welding guns pounding against the work as each set of ports was closed and opened. A newer design called "ultra-speed" had been developed and most manufacturers made use of it, closeup view of the guns in a typical setup being shown in Fig. 3.

Alignment While Welding—One of the chief advantages of the ultra-speed welding is being able to have all welding guns contact the work at the same time, thus assuring that the parts are in alignment

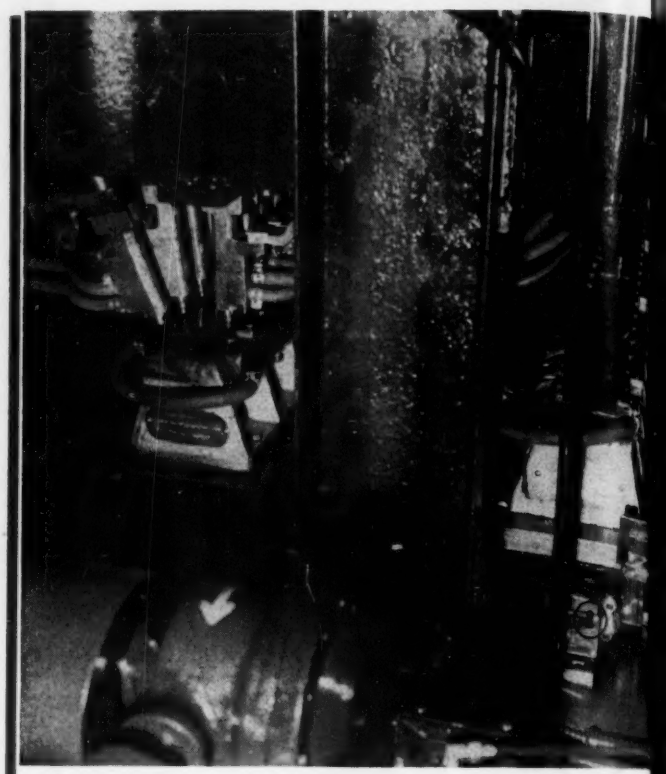


Fig. 2—Side view of multitransformer type welding machine showing dual fixtures on reciprocating table. Smaller secondary loops allow more transformers to be fired from each phase of a three phase system without increasing load

while being welded. Each unit has its individual transformer and in most cases employs series welding. With all the welding guns contacting the work, considerable time is saved over the hydromatic type by not having to move each bank of guns to and from the work before the next bank of guns can be used for welding.

This type of welder has a mechanism built into it for breaking both the primary and the secondary, or welding, circuits. After breaking the welding circuit to any set of welding guns, it cannot be re-closed until the ultra-speed unit reverses. This principle allows all welding guns to contact the work simultaneously. It also shortens the welding cycle, because it only takes about ten cycles of time to change from one set of guns to the next set, against 18 to 20 cycles for the hydromatic type.

Further shortening of weld time can be realized by having the welder manufacturer build into the ultra-speed units an arrangement of two transformers instead of one. This results in a time cycle on one machine of three pieces per minute, as against a total of three pieces per minute on three similar machines using hydromatic units.

Multitransformer Method—Recently, another welding method has come into popular usage. This is known as the multi-transformer method of welding, shown in Fig. 2. This method uses a group of small transformers with one or more secondaries to each transformer. A set of welding guns is used with each secondary. This particular method for the first time allowed the transformers to be placed close

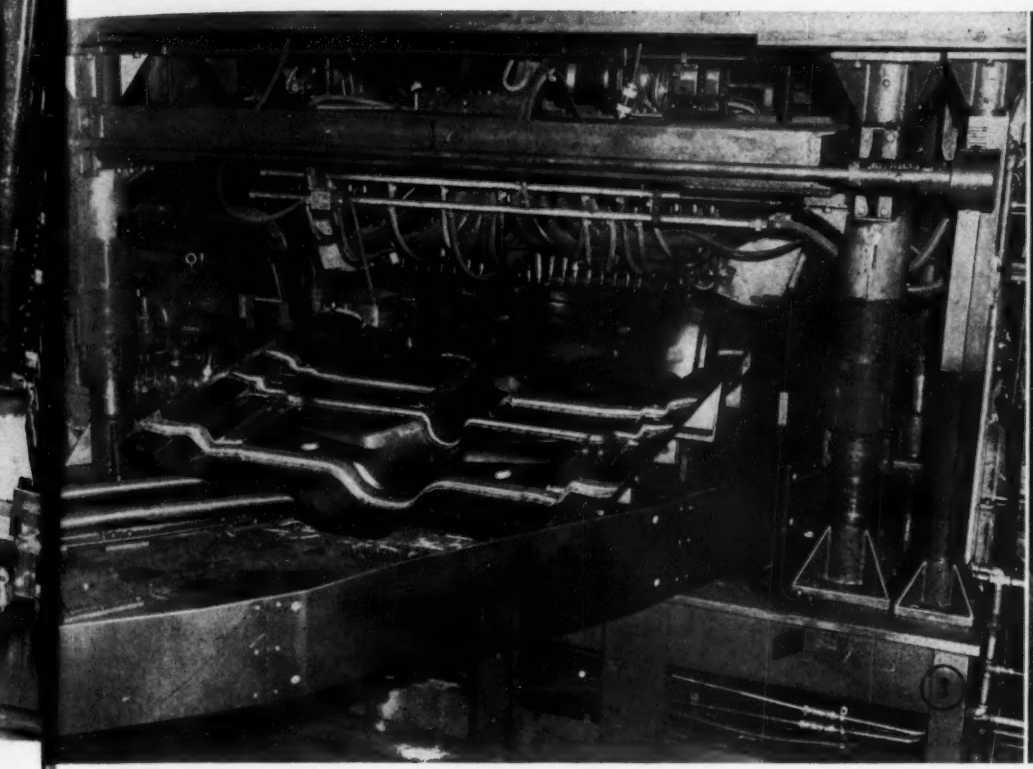


Fig. 3—All guns contact work simultaneously and are "fired" in group through separate welding circuits with the ultraspeed type of multiple spot welder

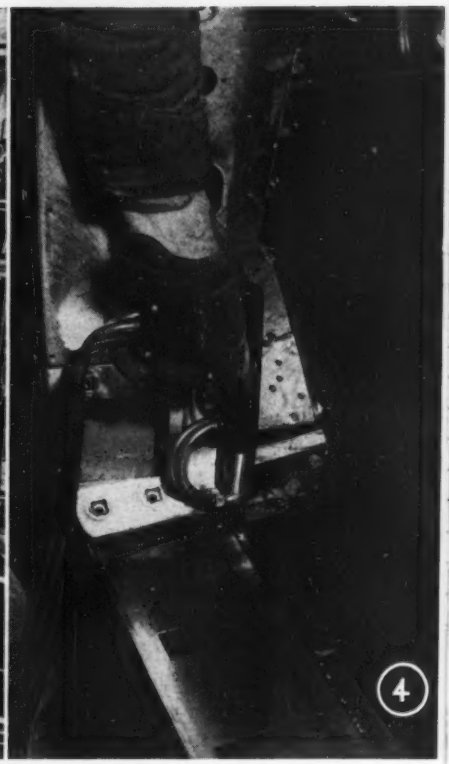


Fig. 4—"Poke spotwelding" uses a lightweight gun, a fixed electrode, a device for cooling electrode and a means for surrounding weld area with argon gas

enough to the work, so that secondary leads from 10 to 16 inches long could be used between transformer and welding gun. It also kept the secondary connections side by side, as they should be instead of in a large loop spread far apart as in the hydromatic and ultra speed units. This compact secondary allows the transformers to be built smaller, making a more compact and neater appearing machine which is always desirable in the shop.

Smaller secondary loop allows more transformers to be fired from each phase of a three-phase system without imposing a larger load on the system. For instance, four multi-transformers each having four guns can be fired successively on each of the three phases, making a total of 48 spots produced at the same time. This would impose a load of 160 to 200 kilovolt-amperes on each phase.

Contrast this with the hydromatic and ultra-speed methods. To produce the same amount of spots at once, they would require 400 to 500 kilovolt-amperes on each phase. The multi-transformer enjoys this advantage in a very much shorter weld time. Suppose an assembly is scheduled to have 144 spots. With the multi-transformer method, it would take three separate firings or weld times. Assume a weld time of 20 cycles, two cycles to change the firing relay from one bank of transformers to the next bank, 10 cycles squeeze time and 10 cycles hold time. The total weld time would take only 84 cycles, or a trifle over 1½ seconds.

This compares very favorably to 3-3½ seconds for the ultra-speed, and 6-7 seconds for the hydromatic method. This considerably speeds up the complete cycle of the welding machine and will produce more pieces per hour, providing better and easier loading methods are used to take advantage of this short weld time.

Poke Spotwelding—One of the newest methods to come into use is poke spotwelding, as shown in Fig. 4. This method employs a lightweight gun, a fixed electrode, a device for cooling the electrode and means for surrounding the weld area with argon gas. To make the weld, the operator pushes the gun against the surface to be welded, opens a valve which starts the gas flowing and closes a switch in the handle of the gun causing a high-frequency current to flow from the electrode to the work.

High-frequency current is used to start the flow of high welding current. After a preset time interval, which can be varied to suit the material being welded, both currents are shut off and the weld is complete. This method was developed primarily to weld in places where portable welders could not be used because of their size.

For example, it is used for boxed-in sections which occur at pillar reinforcements to the floor pan, seat risers to the floor pan and similar locations. Undoubtedly, as poke spotwelding is improved, there will be many more applications where it can be used to advantage.

From a paper presented recently at the national passenger car and production meeting of Society of Automotive Engineers, Detroit.

Organic Finishes for Metal Products

Important factors in the preparation of metal for painting, how to be sure surfaces are clean, methods of getting nonferrous metals set for organic coatings, are among the subjects taken up in this third part of the current series

METHOD, or combination of methods, used in preparing metal for painting should be selected depending upon the composition of the metal and the nature of the contaminants to be removed. Certain nonferrous metals and alloys are chemically attacked by alkali or acid and such metals should not be subjected to any cleaning procedure that would affect detrimentally, their composition or physical properties.

Generally speaking, contaminants on metal surfaces may be termed visible and invisible. Visible contaminants such as grease, oil, and dirt cause much less trouble than invisible contaminants like alkali, salts, acids and handmarks, for they usually cannot be detected by appearance, and when present under an organic coating, accelerate corrosion and promote blistering of the organic coating finish.

Many cleaning procedures will provide metal with a clean appearing surface, and yet it will not be satisfactory for painting. Any cleaning procedure in which the final water rinse contains small amounts of alkali or soluble salts, will leave an invisible and active residue on the surfaces of articles rinsed therein, which is apt to cause premature failure of the paint. It is a fairly easy matter to protect against the presence of alkali in the rinse water by maintaining the solution at a pH below 5 with a mixture of chromic and phosphoric acids.

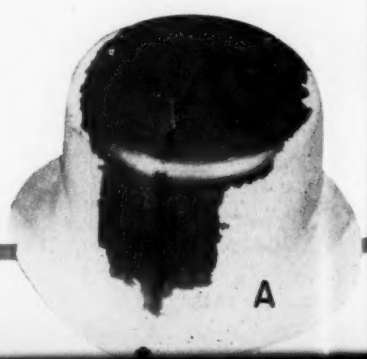
In localities employing water softening systems, it has been pointed out that there is frequently on wash day (Monday) sufficient alkali in the tap water to make it unsuitable, without neutralization with chromic acid or phosphoric acid, as a final rinse for articles prior to painting. The effect of water hardness on paint blistering of articles rinsed therein, is indicated in Table I based on data collected by the Parker Rust-Proof Co., Detroit. Phosphate coated panels were rinsed by immersion in the separate waters, with and without the addition of chromic acid, followed by drying and finishing with baked alkyd enamel. The painted panels were subjected to humidity test at 100° F and 95 per cent and 100 per cent relative humidity for 101 hours to determine the amount of paint blistering. It is known that the degree of blistering in a paint finish adversely affects the protective life of the coating where moisture is a factor. Importance of the proper rinsing of articles prior to painting cannot be over-emphasized wherever maximum performance of the finish is required.

How To Determine When a Surface Is Clean—A test frequently specified to determine when a metal surface is clean is to immerse it in water and upon removal it shall support a film of water, breakfree. However, this test does not reveal the presence or absence of acids, alkali or salts on such surfaces, and for this reason it cannot be relied upon as a test for determinng the suitability of a surface, prior to organic finishing. It has also been demonstrated that metal surfaces containing oil in combination with a wetting agent[15] will support a film of water, breakfree.

A recent refinement of the water-break test is that of spraying the cleaned surfaces with a fine spray of water[16] which condenses as droplets on areas containing oil or grease. Because of the thinner water film resulting from spraying, as contrasted to immersion, the test is reported to be capable of yielding results of good reproducibility. However, the test does not indicate the presence of water soluble salts or alkali, and for this reason cannot be relied upon

TABLE I
EFFECT OF WATER HARDNESS ON PAINT BLISTERING OF ARTICLES RINSED THEREIN

Source of Water	pH	Water Composition ppm — Free Alkali	Total Alkali	Cl	SO_4	Blistering of Paint at 101 Hours Humidity Test — Water without Chromic Acid	Water with Chromic Acid
Detroit, Mich.	6.4	0	81	7	12	100%	None
Janesville, Wisc.	7.5	0	310	4	4	100%	None
Butler, Pa.	9.1	1.0	21	28	8	10%	None
Norwood, Ohio	7.5	0	335	26	Nil	100%	None
St. Paul, Minn.	7.5	0	82	3	32	10%	None
Dayton, Ohio	7.4	0	278	8	116	100%	None
Connersville, Ind.	7.4	0	298	10	72	100%	None
Galesburg, Ill.	7.8	0	255	187	390	100%	None
Imlay City, Mich.	7.9	0	248	1550	300	100%	70%



for determining the suitability of a cleaned surface for painting.

Another advance in the measurement of soil retention of metal surfaces is that of Morgan and Lankler who devised a method of photographing[17] fluorescent oil residues under ultraviolet light after a standard cleaning procedure. It has been reported that certain oil films do not fluoresce and thus this method is of doubtful value in determining the cleanliness of some types of surfaces. In addition, the test does not indicate the presence of certain alkali or salt residues and is unreliable for determining the suitability of a cleaned surface for painting.

Mears has suggested[18] that the uniformity and corrosivity of a steel panel surface was a measure of its cleanliness. In carrying out the test, a panel specimen is dotted with a large number of droplets of a suitable corrosive liquid, such as hydrogen peroxide, and the time of the first appearance of corrosion on each droplet, as well as the nature of the corrosion products is noted. Average time elapsed to the first appearance of rust serves as a measure of the corrosivity, while the nature of the corrosion products, and the spread between these values for the various droplets measures uniformity. The opinion has been expressed[4], that this test, while being useful for indicating the activity of a cleaned surface, has little merit for determining the suitability of a surface to receive an organic finish because it does not indicate the presence of residual salts, which are known to be detrimental under paint coatings.

When it is desired to test a given procedure for metal preparation, for cleanliness and suitability for painting, perhaps no method serves the purpose better than immersing the painted article in water for 24 to 48 hours, which is usually sufficient to reveal blistering in the paint coating at areas which contain active residue[4]. This test, however, will not indicate the presence of traces of oil or grease remaining on the surfaces from the cleaning operation. The effect of oil under the paint coating can usually be detected by an adhesion test, such as the familiar knife test, frequently used for this purpose.

Preparing Nonferrous Metal Surfaces for Organic Coatings—It is recognized that zinc and its alloys, when painted may present a difficult adhesion pro-

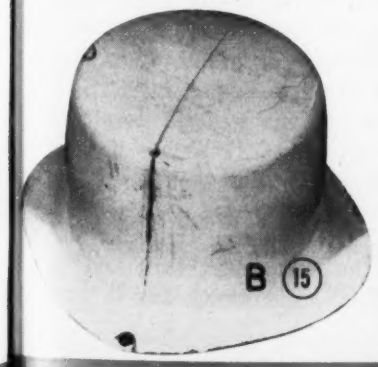


Fig. 15—(A) Stamping made from zinc-flash sheet, given one coat of synthetic enamel, scratched and exposed to salt spray for 400 hours. Enamel has peeled from raised surface. (B) Stamping made from phosphate coated zinc-flash sheet by Bonderizing process, exposed to salt spray 400 hours. Finish still good

Fig. 16—(A) Panel of plain sheet steel given two coats of synthetic enamel, scratched, exposed to salt spray for 335 hours, showing degree of failure. (B) Panel of phosphated zinc-flash sheet steel, given two coats of synthetic enamel, scratched, Olson impression made and exposed to salt spray 417 hours, showing good condition of finish. Courtesy Parker-Rust-Proof Co.

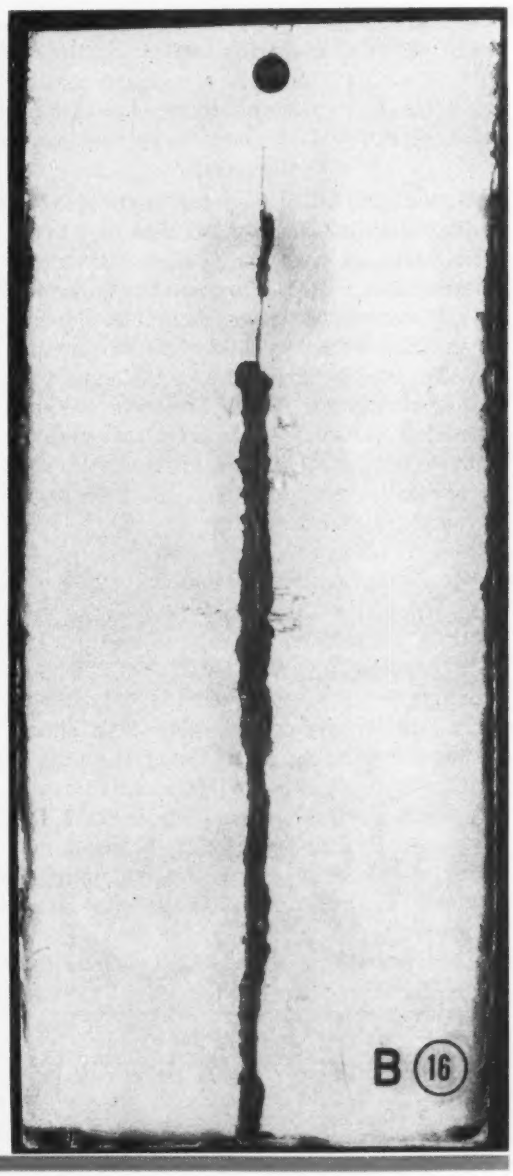


Fig. 17—Installation of tanks for anodizing aluminum. Courtesy Reynolds Metals Co.

blem due primarily to their reactivity with the vehicle of some organic coatings. Various methods of preparation have been used to overcome this condition such as acid etching and weathering prior to painting. While such treatments roughen the surface, and improve initial paint adhesion, they do not prevent reaction between the paint vehicle and the zinc. Conversion of zinc surfaces to phosphate coating and processes for formation of conversion chromate surface coatings are widely used to prevent reaction of the paint vehicle with the metal.

Zinc Plated Steel—Corrosion-resistant steel is now available with electro-plate zinc of 0.0005 to 0.0001-inch thickness with the surface converted to a phosphate coating. In the process the outer surface of the zinc is converted to an insoluble phosphate coating of the Bonderized type, and there remains a layer of metallic zinc between it and the steel for added corrosion resistance. Table II shows the comparison in corrosion resistance of such zinc-plated and phosphate-coated steel, with untreated steel after 156 days in humidity test, at 100° F and 95 per cent to 100 per cent relative humidity.

Combination of zinc-plated and phosphate-coated steel makes available steel protected against corrosion, which is especially suited for fabrication of articles therefrom, with the assurance the coating will provide an excellent base for applied paint finishes.

The phosphate-coated, zinc-flash sheet is in condition for painting as it leaves the mill. When paint is to be applied before fabrication, such as in the production of lithographed signs and Venetian blinds, no cleaning is necessary. If, however, the sheets accumulate foreign matter in shipping, handling or fabrication, effective cleaning can be accomplished in several ways.

1. Spray dilute alkali (⅛-½-ounce to each gallon of water) plus hot water rinse, followed by a hot dilute chromic rinse (2 grams per gallon of chromic acid) for 30 seconds.

2. Trichlorethylene degreaser, followed by hot dilute chromic rinse (2 grams per gallon of chromic acid). When a drawing compound containing inert material is used, the articles should be spray water rinsed after degreasing and before chromic rinsing.

3. Wiping with solvent is satisfactory, but usually will not provide as high corrosion resistance as the above cleaning systems. Wiping should be followed by the chromic acid rinse, if possible. Pickling acids or strong alkaline cleaners are not recommended for preparing phosphate coated surfaces for painting. However, no matter what cleaning system is used, all surfaces must be thoroughly dried before painting. Fig. 15 shows a comparison of the adhesion. Fig. 16 gives a comparison of corrosion resistance of organic coatings on plain zinc plated steel and zinc plated steel, phosphated.

Chromate type conversion coatings may also be used to prepare zinc plated steel for organic coatings, such as are described in the following section on preparation of zinc base dies castings for painting.

Coatings on Zinc Base Die Castings—Protective coatings on zinc base die castings produced by converting the surface of the metal into a chemical compound of exceedingly low solubility in the environment to which it is to be exposed are of increasing importance and are being widely used. Usually these chemical treatments are applied to prepare zinc surfaces for subsequent organic coatings, the adherence of which is improved thereby. Another important function of these chemical conversion coatings is to inhibit the spread of corrosion when finishes are scratched through or chipped. Several chemical treatments involving short dips or spraying in chemical solutions or simple electrolytic treatments are commercially available for use with zinc base die castings.

The "Cronak"[19] film process has been developed by New Jersey Zinc Co. specifically for chemical treatment of zinc surfaces. The treatment usually produces a golden brown color showing some iridescence. It can be used with or without a subsequent coating. Normal operation of the "Cronak" process is given below, according to recommendations of New Jersey Zinc Co. Cleaned work is dipped for approximately 10 seconds in a solution consisting of approximately 200 grams per liter of sodium dichromate ($Na_2Cr_2O_7 .2H_2O$) and 6 to 9 milliliters of concentrated sulfuric acid (94 per cent—specific gravity 1.84). The work is then removed, drained for not over 30 seconds and rinsed thoroughly in cold running water. The water is then removed, preferably by air blasting.

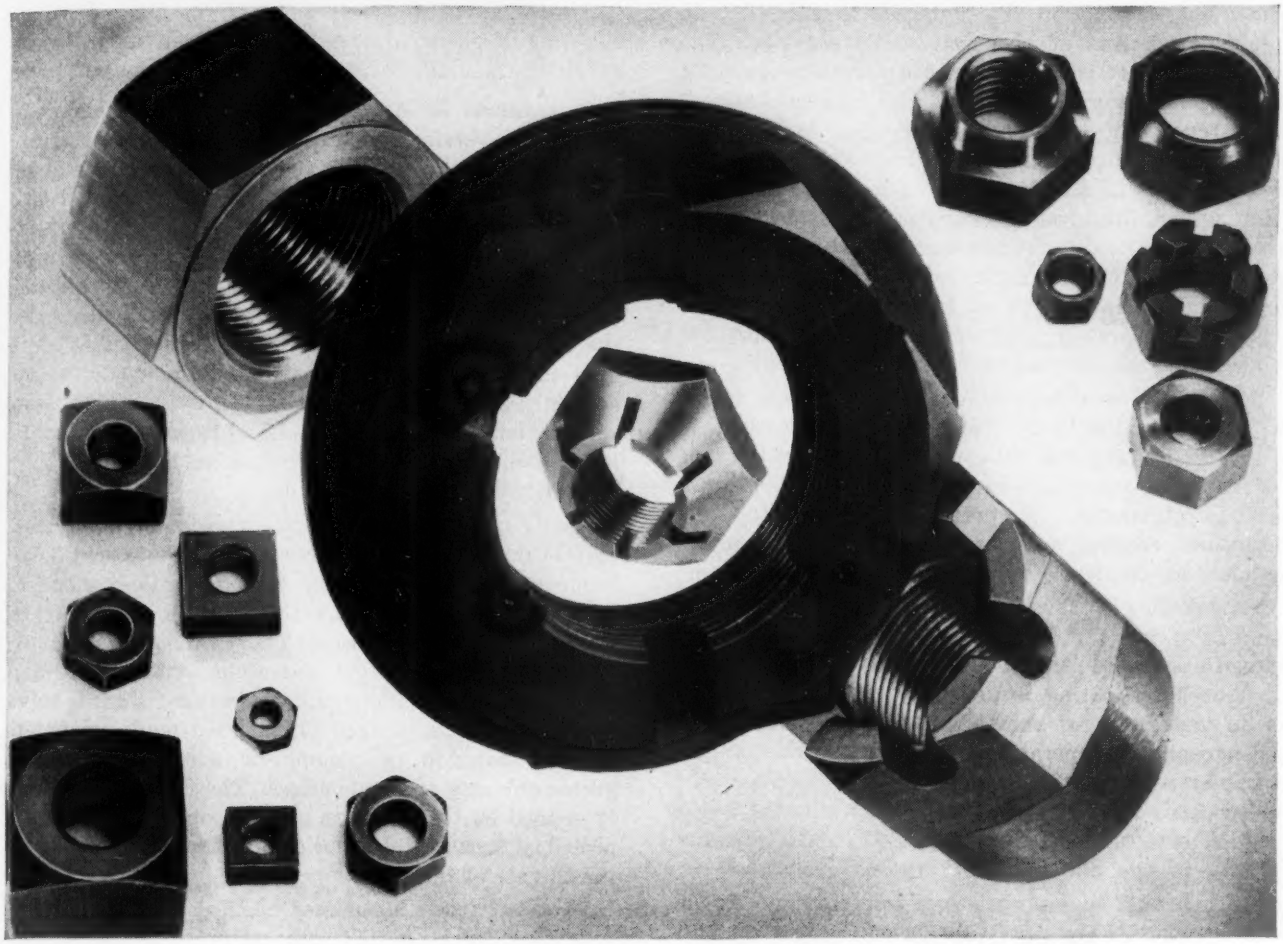
Careful chemical and physical studies[20] of the "Cronak" film have led to the conclusion that it is a basic chromium chromate of the general formula: $Cr_2O_3.CrO_3.2H_2O$ or $Cr(OH)_3Cr(OH)\ CrO_4$. it is a characteristic of the "Cronak" film that it slowly releases its hexavalent chromium to water which comes in contact with it. It is believed that this dissolved material inhibits the subsequent corrosion of the zinc and insures that accidentally bared zinc areas are protected.

The "Iridite" dip process[21] produces an adherent

TABLE II

CORROSION OF UNTREATED AND ZINC PLATED STEEL PHOSPHATE COATED AFTER 156 HOURS HUMIDITY TEST

	Wt. Loss, mg./cm²
Untreated Steel	12.07
Steel, Zinc Coated and Phosphated	0.60



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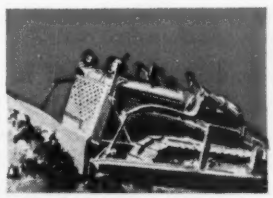

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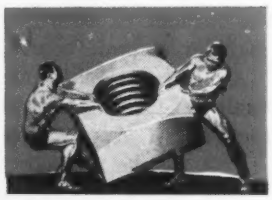

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conversion coating on zinc surfaces that belongs to the general class of chromated zinc coatings. The finished product is covered with a corrosion-resistant olive drab coating. Other colors also may be obtained. It is reported[22] that chemical studies have shown that the major portion of the "Iridite" type coating is composed of a chrome gel compound, probably lying within the group of chrome hydroxides or hydrated chrome oxides. The essence of the coating appears to be the chromium containing compound or compounds. The process, by forming a continuous integrated surface film of chrome gel, inhibits the tendency of the zinc base to undergo solution.

"Anozinc"[23] is a type of conversion coating which is formed anodically by treating zinc die castings in a modified chromate bath with the use of electric current. The procedure is similar to that used in anodizing aluminum. Properties claimed[24] for the "Anozinc" coating are hardness and good wear resistance as compared to nonelectrolytic coatings.

Phosphating of zinc base die castings for increased paint and lacquer adherence has come into widespread use in the last few years. The Bonderite[5] type of phosphate coating is intended principally for use as an undercoat for subsequent organic coatings. In the phosphating operation, the outer surface of zinc is converted into a water insoluble phosphate coating; added corrosion resistance of this film plus the finely grained crystalline coating structure contribute materially to the adherence of organic coatings.

"Lithoform" is a proprietory treatment of American Chemical Paint Co. which produces a gray surface film on zinc die castings and is intended for use as an undercoat for organic coating. "Black Magic", a proprietory process of the Mitchell-Bradford Co., produces a jet black coating on zinc surfaces which is useful with or without subsequent coating. "Ebonol Z" is a blackening process developed by the Enthone Co. This treatment is reported to be suitable for indoor exposure or, with hard drying wax or lacquer, for outdoor exposure, as well as a satisfactory undercoat for organic coatings.

Advantages of using chemical treatments in high quality finishing of zinc die castings should be fully recognized. Appearance, commercial adaptability and general utility are factors to be considered when selecting a chemical treatment, as well as methods of application, limitations, and practical uses.

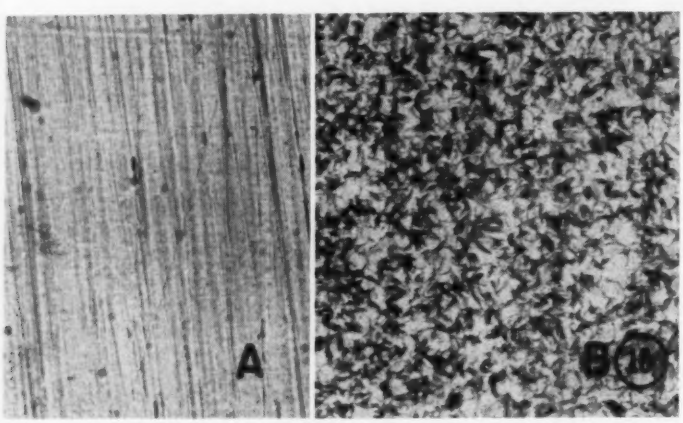


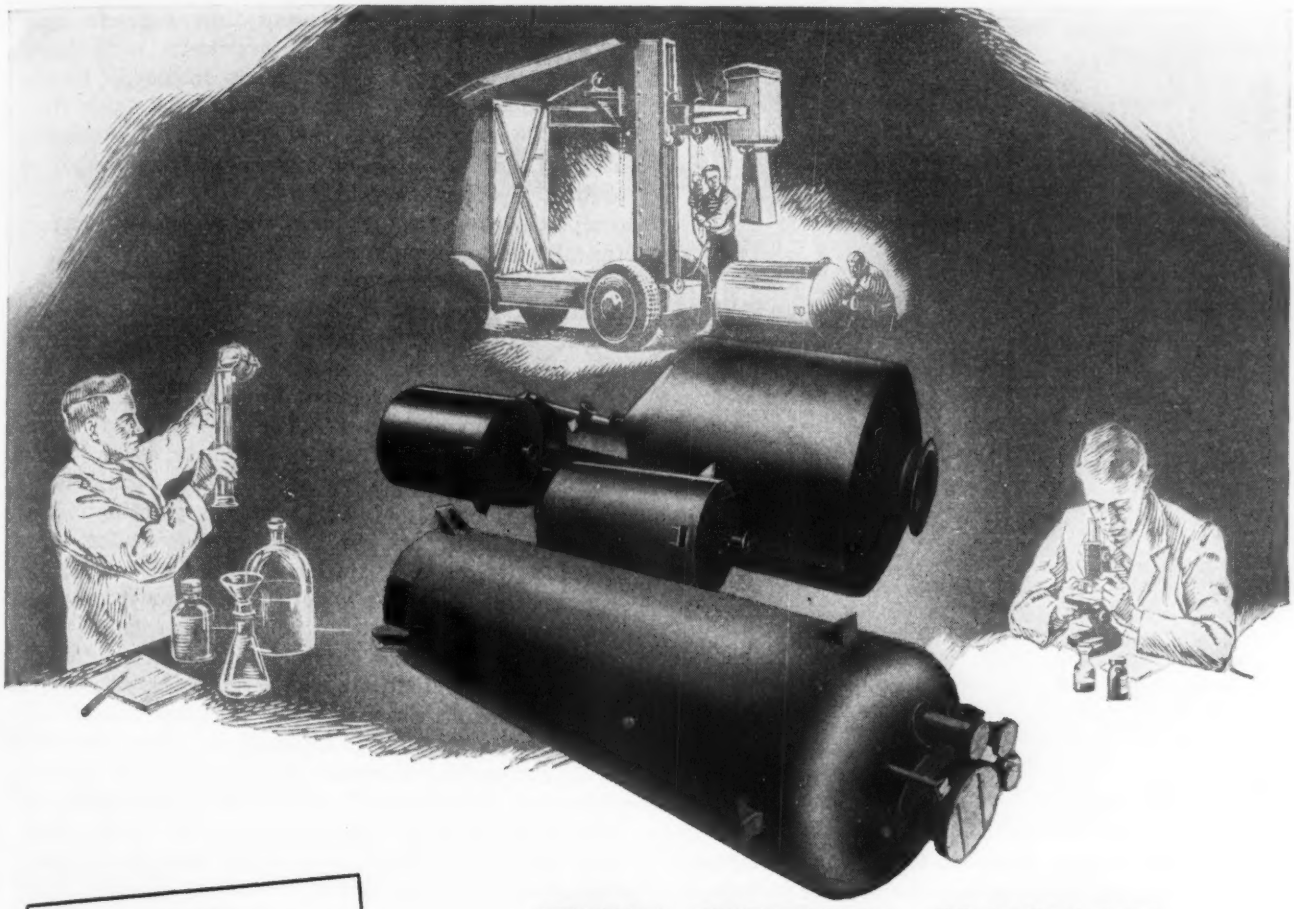
Fig. 18—*(A) Photomicrograph of untreated 24S-T aluminum sheet; (B) Photomicrograph of phosphate-coated 24S-T aluminum sheet. Courtesy Parker Rust-Proof Co.*

Preparation of Aluminum for Organic Finishes—Surface conversion processes are the only methods in use which prepare the surface of aluminum as a good base for an organic finish. Surface conversion coatings, formed by chemically converting the metallic surface, have as their main objective the formation of a stable and nonreactive coating, integral with the base metal, which inhibits corrosion and increases the adherence of applied organic finishes. The common methods of converting aluminum surfaces are acid etching, treatment with phosphoric acid-organic solvent mixture, production of chemical oxide coating, production of electrochemical oxide coating, and formation of phosphate coating.

Acid etching treatments may consist of immersion of the aluminum in phosphoric or chromic acid, subsequent to cleaning in an inhibited alkali cleaner. The process is commonly referred to as chromodizing when chromic acid is used. Thus, films of aluminum phosphate or chromium containing compounds are supposedly formed. The phosphoric acid-organic solvent mixture is a surface preparation made up of an aqueous solution of phosphoric acid with organic grease solvents and emulsifiers. The mixture is usually applied by the brush-on method, or by dipping, and probably forms a thin film of aluminum phosphate on the surface of the metal.[25]

Chemical Oxide Method—Chemical oxide method is illustrated by a two-step process in which the aluminum is immersed in a hot solution containing sodium carbonate and chromate followed by a water rinse and then a sealing treatment, in hot potassium dichromate solution[26]. The electrochemical oxide coating is formed by an anodic treatment using as electrolytes aqueous solutions of acids such as sulphuric, chromic, boric or oxalic[27]. By controlling the conditions, the characteristics of the oxide coating on aluminum can be varied over a wide range. The coating is intrinsically hard and offers substantial resistance to wear and rubbing abrasion. Naturally, the resistance to abrasive wear increases with the thickness of the coating, and this can be controlled by the operator to suit the needs of the intended application. For protection against weathering, dense, thick coatings give the best results. Anodic oxide films on aluminum offer an excellent base for the application of paints, enamels and lacquers. Extensive use of this property of aluminum was made during the war in finishing military equipment, such as aluminum aircraft parts, which are subjected to severe service conditions in marine and tropical environments. Tanks for anodizing aluminum are seen in Fig. 17.

Anodic oxide coating as initially formed on aluminum, is filled with myriads of pores too fine to be seen under the microscope. This minutely porous structure is a valuable characteristic of the coating and can be used to good advantage. For example, when protection is the main consideration of the conversion coating process, corrosion inhibitors, such as chromates, may be absorbed and sealed within the pores. This procedure is usually followed when



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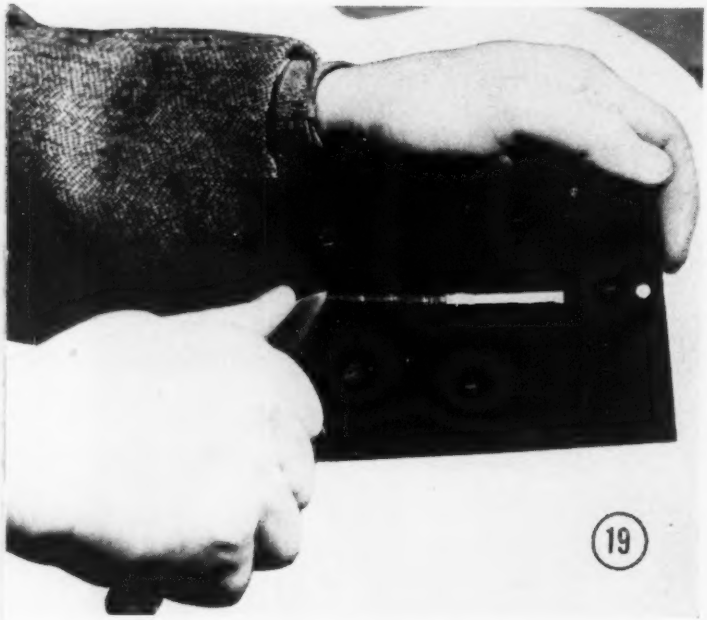

Fig. 19—This photograph illustrates increased adherence of organic coatings over aluminum surfaces given a phosphate treatment. Left half of panel is Bonderized; right half—untreated

the oxide is to form the base for a protective organic coating or enamel system[28].

Phosphate Coating Methods—A recently-developed surface coating method for aluminum, prior to organic finishing, consists in reacting the aluminum surface in a metal acid-phosphate solution containing oxidizing agents and a complex fluoride for accelerating the coating action[29]. The metal surface is converted to a finely crystalline, nonmetallic phosphate coating of the proper texture, adapted to inhibit corrosion and increase the adherence of any applied paint coating. Photomicrographs in Fig. 18 show untreated and phosphate-coated 24S-T aluminum sheet. Fig. 19 illustrates the effect of phosphate coating on paint adhesion. An aluminum alloy panel was cleaned with an organic grease solvent, then the lower part of the panel was given the phosphate coating treatment (Bonderized). An Alkyd baking enamel was applied and then ruptured lengthwise of the panel by the commonly used knife test.

Poor paint adhesion on the untreated surface and the excellent performance over the phosphate coating are apparent. The commercial phosphating process produces on aluminum and its alloys, either in sheets or castings, a paint-holding phosphate coating, similar to that produced on steel and zinc surfaces. Thus, besides coating aluminum, the process also coats zinc and steel and their alloys, a feature which will be readily appreciated by manufacturers who may have mixed production of these metals. Like the phosphating processes used with these other metals, the process requires no electric current, may be applied by either spray or immersion, and is readily adapted to conveyor production methods.

The aluminum surface is converted to the phosphate coating[30] by immersion in the processing solution for 30 seconds to 4 minutes at 170-185° F, or by spraying the solution for 10 seconds to 2 minutes at 140-155° F. The processing time depends upon such factors as the type of aluminum alloy being treated and surface pretreatment required. Excess coating chemicals are removed by a cold water rinse lasting 20-60 seconds. A final rinse of the coating in a 0.05 per cent solution of chromic acid or phosphoric-chromic acid mixture, followed by a dry-off stage, completes the cycle of preparing the metal surface for all types of organic finishes.

Preparing Magnesium — A satisfactory chemical treatment for magnesium prior to organic finishing is one which produces a continuous, inert, adherent film over the metal surface; it is also desirable that this film contain ingredients which inhibit the corrosion of magnesium. In general, chemical treatments which protect unpainted magnesium alloys against corrosion usually meet the above requirements for a chemical treatment prior to painting. Most chemical treatments for magnesium involving chromates, improve the painting qualities of magnesium alloys. The two most widely used commercially are the chrome-pickle treatment and the dichromate treatment, including slight modifications of these, depending to some extent on the severity of subsequent exposure conditions.

Sometimes magnesium products are given some kind of a chromate treatment by the producer prior to shipment. Under such conditions if the parts are used as received, no additional chemical surface treatment may be required. If, however, subsequent manufacturing operations injure or remove a portion of the chemically treated surface, it is generally considered advisable to retreat the part before application of the organic finish.

There is much evidence to show the valuable properties of the chrome-fickle treatment as a paint base. Based on recommendations of Dow Chemical Co.,[31] the matte-gray to yellow-red iridescent coatings showing a pebbled etch under the microscope are best suited for good anchorage as a paint base. On the contrary, smooth bright yellow coatings provide little anchorage as a paint base. It is reported that the bright smooth coatings are produced in old chrome-pickle solutions, whereas the matte type coatings, most desirable for paint base, are produced in relatively fresh solutions. Dichromate treatment is generally recommended as a paint base on magnesium products where maximum protection against salt water exposure is desired.

Chrome-Pickle Treatment as a Base for Organic Finishes — Before chrome-pickling, the magnesium parts which are to be given an organic finish should be suitably cleaned and pickled. They are then immersed in either of the following[32] commercially used baths:

BATH NO. I

Sodium Dichromate ($Na_2Cr_2O_7.2H2O$)	1.5 lbs.
Nitric Acid (HNO_3—Sp.Gr. 1.42)	1.5 pints
Water	to make 1 gal.

BATH NO. II

Sodium dichromate ($Na_2Cr_2O_7.2H_2O$)	0.75 lbs.
Nitric acid (HnO_3.Sp.Gr. 1.42)	0.50 pints
Water	to make 1 gal.

Bath No. II is usually applied in treatment of finish-machined parts. The time of immersion is ½ to 2 minutes for unmachined parts or raw castings and 15 seconds for finish machined parts. Baths should be maintained at 70 to 90° F. After immer-

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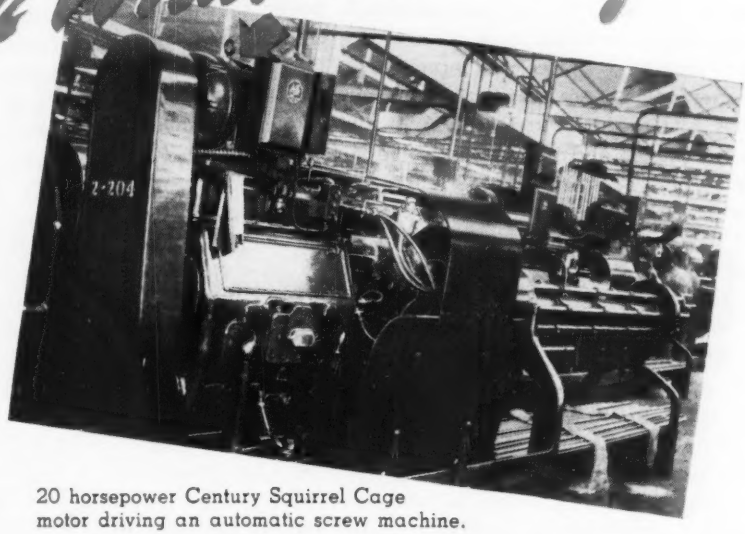


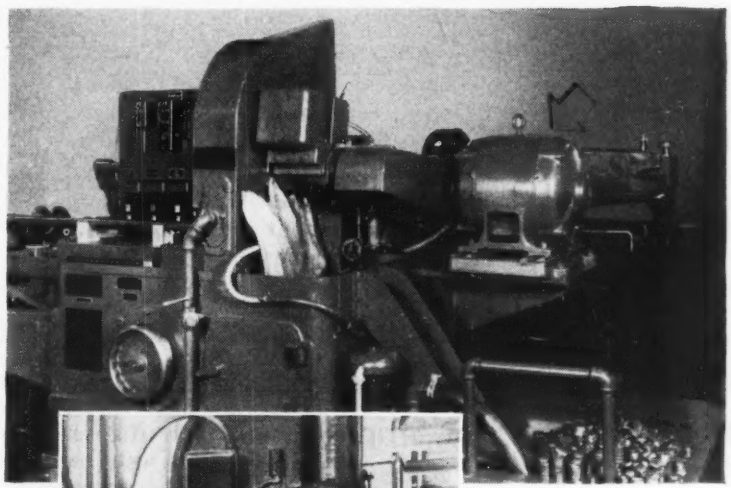
20 horsepower Century Squirrel Cage motor driving an automatic screw machine.

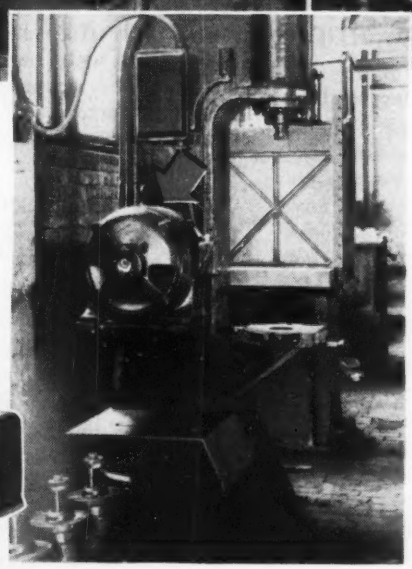
From the precision high speed production of an automatic screw machine to the rugged power of a large press, there's a Century motor with the stamina to stay on the job.

Throughout their wide range of types and sizes Century motors are ruggedly built. Rigid frames, accurately machined feet, large shafts, accurate alignments, adequate ventilation system and good mechanical and electrical balance — all contribute to their outstanding performance.

Century builds a complete line of fractional and integral horsepower electric motors, polyphase, single phase and direct current, in the popular sizes to meet the requirements of industrial production, processing, commercial and appliance needs.

Specify Century motors for all your electric power requirements.





10 horsepower Century Squirrel Cage motor driving an abrasive cut-off machine.

7½ horsepower Century Squirrel Cage motor driving a pump on a hydraulic press.

Century Electric Company

1806 Pine St., St. Louis 3, Mo.

Offices and Stock Points in Principal Cities

550

sion, the articles are held above the bath and allowed to drain for 5 seconds and are then thoroughly rinsed in cold water followed by hot water rinse to facilitate drying. The dimensional loss resulting from the 15-second treatment in Bath No. II is negligible. Solutions should be held in either earthenware, aluminum or stainless steel tanks.

Dichromate Treatment as a Base for Organic Finishes—The "dichromate" treatment is the most widely used chemical treatment for magnesium alloys, where a highly corrosion resistant paint base is desired, particularly for maximum salt water corrosion resistance. Articles to be treated are suitably cleaned and pickled by accepted procedures. They are then immersed in a water solution containing 15 to 20 per cent hydrofluoric acid by weight. Time of immersion is 5 minutes and the temperature is maintained at 70 to 90° F. Following this treatment, the articles are thoroughly rinsed and immersed in a boiling 10 to 15 per cent by weight solution of sodium dichromate for 45 minutes. They are thoroughly rinsed in cold water, and finally in hot water, to facilitate drying.

Negligible dimensional changes are effected in this treatment, making it very valuable for finish machined parts. Inserts of brass, bronze, and steel are not affected by the treatment although aluminum and cadmium plate are attacked by the hydrofluoric acid solution. This treatment has the distinction of affording the most salt water corrosion resistance of any of the Dow treatments, and provides a very fine corrosion resistant paint base for magnesium and its alloys.

Preparation of Copper, Brass and Lead for Paintings—Because of the difficulty in obtaining adequate adhesion of paint finishes to these metals they are sometimes chemically treated to convert their surface to a oxalate type coating (Loxal Process)[33]. Typical of an example in the improvement in adhesion which has been cited[4] for this treatment, is that of two coats of baked black enamel over untreated and oxalate coated yellow brass, each subjected to salt spray test in which only ¼ inch paint creepage occurred from a given scratch through the paint finish after 1340 hours test on the oxalate coated specimens compared to ¾-inch creepage on the untreated specimens at 377 hours. Considerable experience was obtained during the war from the application of paint over oxalate-coated lead and terne to improve its adhesion and durability.

Thus in any successful finishing system for metal products it should be realized that the preparation of the metal prior to application of the organic finish is equally as important as the composition of the paint or finish used. Removal of all foreign matter, grease, and oil is essential prior to the application of organic coatings to afford normal protection. The use of the proper type of conversion coatings will inhibit the reaction of the paint vehicle with the metal and increase the retained adhesion and durability of organic finishes. Various methods for preparing metal products for organic finishing are available, and in general, the requirement of the organic coating, in the environment in which it is used, should determine the method used.

(To be continued)

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Continuous Gaging Developed for Hot Strip

Continuous thickness gaging of steel in a hot strip rolling mill at Irvin Works of Carnegie Illinois Steel Corp., Pittsburgh, is being accomplished with an x-ray gage made by General Electric Co., Schenectady, N. Y. The new instrument employs an x-ray beam passing through hot strip and falling on a radiation detector which compares intensity with a standard reference and shows deviation on an indicator panel.

Gaging with a hand held micrometer requires waiting until strip cools sufficiently, and during this delay a high speed mill may roll six or more tons of off-gage steel. Also, as strip leaves the rolls it may vibrate vertically through an amplitude of several inches, and to prevent possibility of jams or cobbles, clear opening through gage should be at least 18 inches high. High strip temperature and cooling water sprays which deluge strip and surrounding equipment are other factors which make x-ray gaging technique very desirable.

Special Machine Performs Work on Spindle Supports

Machining operations on automobile front wheel spindle supports can be performed on a 6-station multi-operation machine manufactured by Baker Bros. Inc., Toledo. An automatic power indexing trunnion transfers the parts from the loading station through drilling, boring, reaming, counterboring and tapping operations. Clamping and unclamping of one right and one left hand part at each station is accomplished by a separate hydraulically operated clamping unit.

Standard 3½ x 24-inch floor type hydraulic feed units are located to right and left of indexing trunnion, and have saddles mounted on round 3½-inch diameter nitralloy bars providing maximum accuracy with minimum wear.

Revises Refractory Guide

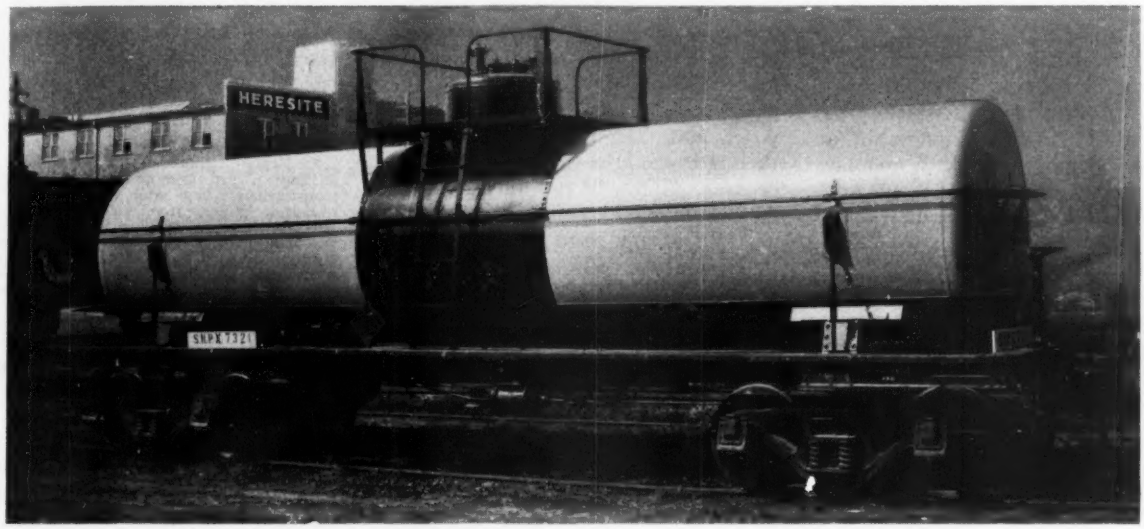
Information as to names and addresses of manufacturers of refractories, location of plants, and an alphabetical listing of refractory products by brand names will be contained in the revised directory now being prepared for publication by American Refractories Institute, St. Louis. Manufacturers in the industry who have not been contacted are asked to communicate with the Institute so that they may be included in the listing.

HERESITE

REG. U. S. PAT. OFFICE

Permanent LININGS FOR TANK CARS

INSIDE AND OUTSIDE



RESISTANCE

Heresite linings effectively prevent product contamination of such items as concentrated Sulphuric Acid, Rubber Latex, Formaldehyde, Lactic Acid, Battery Acid, Acetic Acid, Vinegar, Fruit Juices, and Wine. Tank cars lined 5 years ago are still in daily service.

EASE OF CLEANING

These tank cars are quickly cleaned by Steaming, Hot Water or any type of Solvent.

SYNTHETIC RUBBER LINING

A recently perfected rubber lining will adequately transport caustic ingredients such as crystalline Sodium Hydroxide.

HERESITE & CHEMICAL COMPANY

MANITOWOC, WISCONSIN

Alloy Steels—*Concluded from Page 92*

temperature range (Curve B), the critical cooling rate decreased with increase in carbon up to about 0.75 to 0.80 per cent; thereafter, the critical cooling rate increased rapidly with increase in carbon up to about 1.05 per cent.

"Marked differences in critical cooling rates of the hypereutectoid steels (curves B and C) were caused by differences in austenitic grain size and undissolved carbides at the time of quenching. Both these factors contribute to shallow hardening. Obviously, to utilize full hardening power of the steel, it is necessary to heat the steel to a temperature sufficiently high to insure complete solution of the carbide."

The critical cooling rate was taken as the average cooling rate between 1110 and 930° F, which produced in the quenched specimen a structure of martensite with nodular troostite (fine pearlite) in amount estimated to be between 1 and 3 per cent.

Rowland, Welchner, Hill and Russ[2] conducted a series of experiments on the effect of carbon on the hardenability of two analyses. Abstractions follow from this article and the discussion.

> "End quench hardenability determinations were conducted on two base analyses. Namely SAE 52xx and SAE 46xx, with the carbon ranging in 0.20 per cent increments from approximately 0.20 to over 1.00 per cent normalized and annealed prior structures were studied for quenching temperatures of 1450 to 1700° F and time at 1550° F varying from 0 minutes to 4 hours. Data are presented as the effect of carbon content on hardenability for the various conditions considered. Practical aspects of these results as affecting commercial heat treatments are evaluated and discussed."

Tests were made of induction melted heats in 0.20 per cent carbon increments over the range of 0.20 to 1.00 per cent carbon and later supplemented by two heats of 46xx containing 1.22 and 1.27 per cent carbon. Effect of carbon content for various times at 1550° F and various temperatures at 40 minutes time for 46xx steel is reproduced, Figs. 4 and 6.

"At normal hardening temperatures the hardenability of a given alloy series increases with carbon content to a maximum value corresponding to the position of the Acm line under the condition of testing imposed and then decreases with further increase in carbon content. This decrease is due to the nucleating effect of excess carbide on the decomposition of austenite on quenching."

It might be thought that a disproportionate amount of space has to be devoted to the effect of carbon on the hardenability of steel; however, where the hardenability of carburized steel is being studied, carbon content is of great importance. In fact, Rowland, Welchner, Hill and Russ make some comment on this:

"The behavior of both these series (referring to the 46xx and 51xx series steels) emphasizes the difficulty of obtaining reproducible results from the carburized end quench test developed by Jominy and Boegehold to measure case hardenability. These results show that a variation of a few points in carbon at the level of hardness measurement has a much greater influence on hardenability than a much greater alloy change. The control of carbon content in carburizing poses a considerable problem in performing this test with reasonable reproducibility."

Effect of Alloying Elements on Hardenability—Effect of alloying elements on the hardenability of steel is the subject of many articles. Bain goes very deeply into the subject. The American Iron and Steel Institute in its publication, "Contributions to the Metallurgy of Steel No. 12," entitled—"Calculation of the Standard End-Quench Hardenability Curve from Chemical Composition and Grain Size," Feb. 1946, gives data which make possible the calculation of hardenability in terms of the end-quench test from the chemical analysis ranges of alloy steels.

Figs. 5, 6, and 8 show the minimum, mean, and maximum calculated hardenability in terms of the end quench test for the alloy steels listed in Tables I and II.

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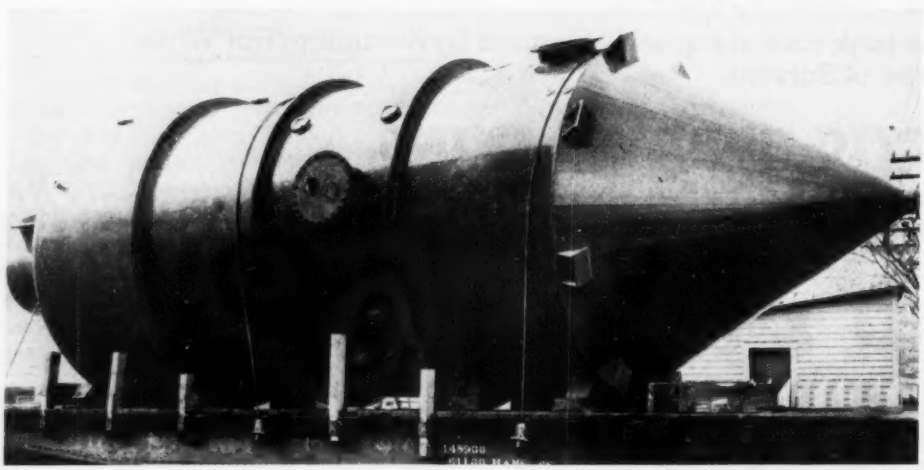
Bronze Alloy Produced For Forming Dies

New aluminum bronze alloy especially engineered for use in forming and drawing dies is now being produced by Ampco Metal Inc., Milwaukee. The new alloy has necessary hardness coupled with high compressive strength and unusual wear resistance to meet special requirements of this service.

Since it is a hard, wear resistant bearing metal, the sliding action of a dissimilar metal over its surface causes little friction and wear.



SEPARATOR TANK: Projectile like in appearance is this huge nickel clad separator tank made by Ohio Machine & Boiler Co., Cleveland, for the chemical industry. Approximate shipping weight is 32,000 pounds of which 26,000 pounds consists of 20 per cent nickel steel and balance pure nickel and carbon steel fittings. Measuring 11-feet 6-inches in diameter, it is 40-feet 10-inches in length

With proper guidance from top management, the nation's workers can powerfully attack inflation at its source.

One way, of course, is by increasing production. But production of most goods already has been pushed to maximum! The other approach is to reduce the volume of dollars that can be used to bid up prices on scarce goods.

There's no more effective tool for this job than the Payroll Savings Plan for the regular purchase of U. S. Security Bonds. Via this plan, 5.5 million wage earners are investing over 8% of their pay—over 100 million dollars per month—in Bonds.

What Is the Status of the Plan in Your Company?

In companies where top management backs the Plan, 35% to 50% of the employees participate, and the average total Bondholding is $1200 per family. If these figures are above those for your employees, it is apparent that the Plan needs reinvigoration by your personal sponsorship.

Benefits Accrue to the Nation and to Your Company

Every Bond dollar that is built up in the Treasury is used to retire a dollar of the national debt that is potentially inflationary. Every Bond held means fewer dollars to go to market to bid up prices on scarce goods. In addition, dollars invested in Bonds are building future purchasing power. All these factors contribute to the security of the national economy—including your business.

Bonds build security for individuals, because every $3 invested pay $4 at maturity.

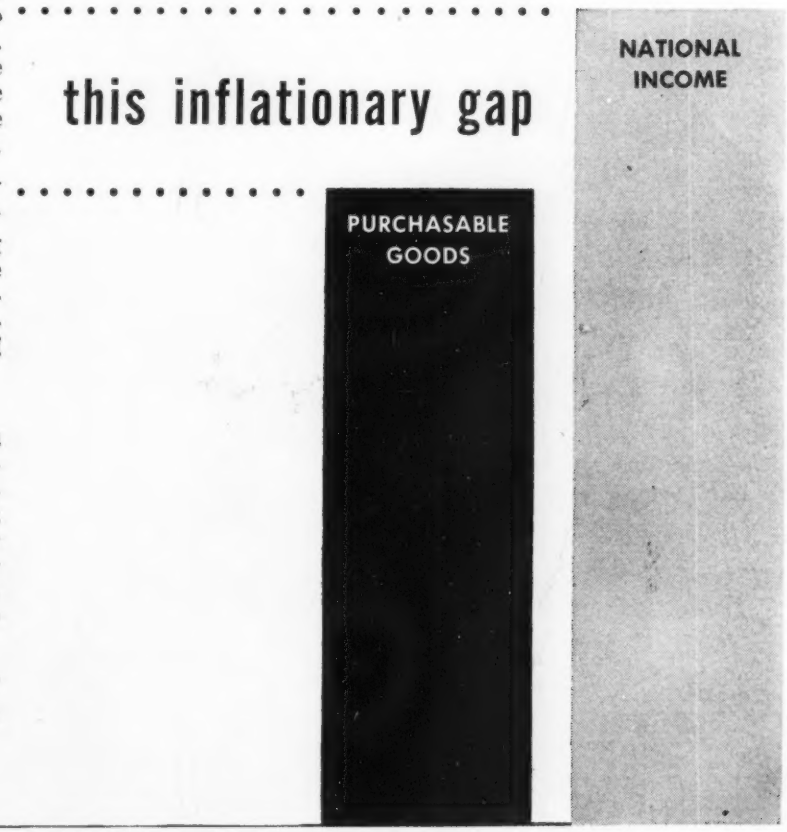
Moreover, in 19,000 companies operating the Payroll Savings Plan, employees have proved to be more contented. Worker production has increased, absenteeism has decreased—even accidents have been fewer!

Management's Role Is Vital

Even with all its benefits, the Payroll Savings Plan requires sponsorship by top management to keep employees *aware* of the benefits. That's why the Treasury Department has prepared a kit of materials especially for you to distribute among specific key personnel. Be sure to get and use your kit—for the security of your company and your country!

For any help you want, call on your Treasury Department's State Director, Savings Bonds Division.

HOW you and your employees can reduce this inflationary gap



The Treasury Department acknowledges with appreciation the publication of this message by

STEEL

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and the Advertising Council.

Program in effect at Eastern steel plant results in higher morale and increased efficiency of employees. Personnel staff studies atmospheric contaminents and recommends control measures. Industrial hazards are eliminated thus providing improved working conditions

Evaluates Health Hazards in New

Industrial Hygiene Laboratory

INSTALLATION of a new industrial hygiene laboratory by Bethlehem Steel Co. is an important development in the company's industrial hygiene program, to seek out and eliminate industrial hazards in its wide-flung plants, and to provide improved working conditions with increased comfort and well being for the employees. Bethlehem has been a pioneer in industrial hygiene work. This activity is a division of the company's medical organization, and is under the direction of an experienced industrial hygiene engineer, who, in turn, reports to the company's medical director.

The new laboratory located at Bethlehem, Pa., serves the company's steel plants, mines, shipyards and fabricating works. It is in the charge of an industrial hygiene chemist with long experience in this field, who recently joined the staff. In addition, men with the proper background, generally drawn from the medical or safety staffs, are engaged in the important work of taking special and routine samples of atmospheric contaminants where hazards are likely to exist, devoting as much of their time to this activity as conditions may demand.

The major function of the industrial hygiene division is to detect and evaluate the health hazards and sources of discomfort which may exist throughout a plant, and to assist in the development of proper corrective or control measures that will permit the eradication of such conditions or keep them within safe and unobjectionable bounds. Prevention—not cure, is the keynote in this work. While the medical staff is dealing largely with the worker himself, the personnel of the industrial hygiene division are concerned mainly with his environment, keeping it free not only from direct health hazards, but from objectionable conditions which may cause discomfort

Fig. 1—Taking a sample of air at a location where brick is being handled

Fig. 2—Making a dust count with a microprojector. Image under microscope is transferred to screen at right of operator to facilitate counting of dust particles

and distress. This work of preventing occupational ills—chronic or acute—is already proving highly beneficial to the health and comfort of the workers. And many indirect benefits, such as higher morale and increased efficiency, are also invariably gained through an adequate and efficiently conducted industrial hygiene program.

Control of atmospheric contaminants is by far the most important part in this work. These contaminants include dusts, fumes, smokes, mists, vapors and gases. Other environmental factors of importance are proper heating, (or cooling), ventilation, illumination and noise abatement. Protection against radiant energy must also be provided where such hazards exist.

Dust is probably the major atmospheric contaminant of industrial hygiene significance in a steel plant, and this problem is naturally being given the greater part of attention by the Bethlehem staff. Sometimes the conditions at a certain operation are so similar in other plants of the company that the results of a study in any one plant can be applied elsewhere, but in most cases each plant presents distinct problems requiring their individual method of attack.

In making the present comprehensive re-survey of the plants, and in laboratory work incidental thereto, what might be termed a "first-things-first" approach has been adopted. Due to their long experience in this type of work the men in charge are quickly able to recognize which processes or operations present any major potential hazards or objectionable conditions, and these are being dealt with first, while less severe conditions are taken in order of their importance. Taking a long-range view, this method offers the important advantage of eliminating the most objectionable features as quickly as possible.

Three distinct phases are involved in the technical work of the industrial hygiene staff. They are (1) the collection of samples and study of conditions in the plant; (2) analytical work in the laboratory; and (3) determination and selection of control and correction measures, generally in collaboration with the engineering, purchasing, operating or safety departments.

An industrial hygiene laboratory is unique in the respect that it must be equipped to collect and analyze quantitatively a wide variety of atmospheric contaminants, both solids and gases, in extremely small amounts and in high dilutions. Determinations of concentrations as low as a millionth of a gram per cubic foot of air are not unusual (1 ounce = approximately 30 grams).

The most common method of obtaining samples for analysis is to draw the air through a suitable medium where the contaminant will be collected. As the speed with which samples can be taken is limited by the rate of absorption, condensation, wetting, or electrostatic precipitation, the samples are generally restricted to 10 to 20 cubic feet maximum, and they often run as low as 0.1 to 1.0 cubic foot, and in some cases even 0.01 cubic foot. Quantitative determinations of the minute amounts thus collected, frequently traces only, present real problems, entirely different from those encountered in the ordinary chemical laboratory, and they call for reagents and chemicals of exceptional purity.

The new laboratory is located on the second floor of a building near the main office, and consists of six rooms, with a combined floor area of approximately 1100 square feet. These rooms include an office, dust counting room, general laboratory, calibrating room, storage room, and repair shop.

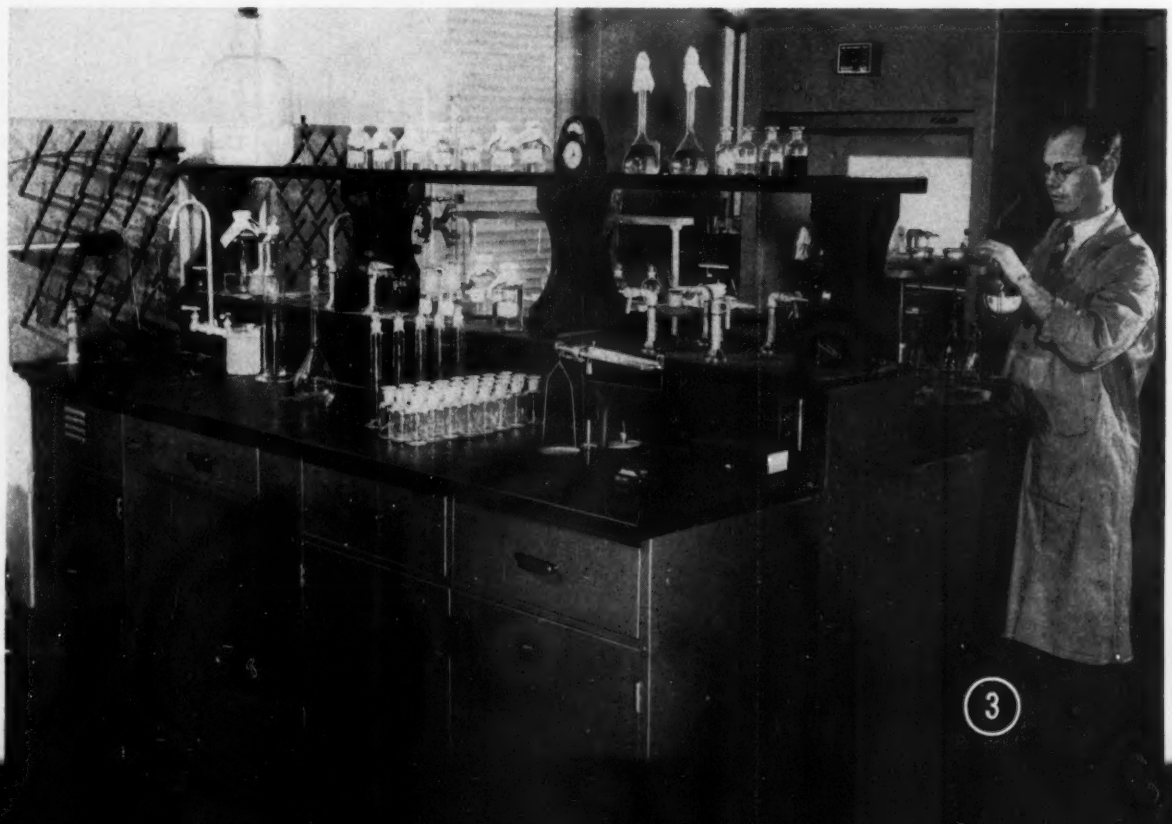
The main analytical room is equipped with a large central work bench with the customary connections for vacuum, compressed air, gas, and electricity, and with a sink and a drying rack at either end. Facing this bench is a hood with electric hot plates. A drying oven and a muffle furnace, both electrically heated, a pH meter for hydrogen ion determination, a still, and the regular chemical apparatus and glassware make up the principal equipment in this room.

In the method most commonly used in determining the dust content of an atmosphere, a definite quantity of the dust-laden air is drawn through an impinger, a specially constructed bottle, in which the dust is arrested by making it strike, at high velocity, against a plate placed in the stream of air. The dust is then collected in a suitable liquid.

Most of the dust thus collected is analyzed chemically for its content

(*Please turn to Page* 128)

Fig. 3—*Analytical work room in new laboratory*



Life-Line

Usual slot design is rectangular, with sharp corners into which slot cell insulation must be creased and coils must be pushed.

Life-Line slot design is pear-shaped. Coil slips in easily and fills slot—no corner voids remain to collect dirt and moisture.

NEW METHODS . . . NEW MATERIALS . . . OPEN WAY TO LONGER ELECTRIC MOTOR LIFE

An electric motor's "muscle" consists of the "sinews", or coils of wire, packed into slots in the stator of the motor.

If these are "bruised", or cramped or damaged while being put in—or if spaces are left for dirt or moisture to gather—protective insulation breaks down and electrical failures result. *Most motor failures are caused in this way.*

Life-Line—industry's all-steel motor—overcomes these common causes of motor failure. New, pear-shaped slots enable coils to be slipped into place without stress, eliminating need for tapping. No slot corners are left to require creasing of the slot insulation, nor to gather dirt in these voids.

New electrical design is just one of the benefits Life-Line motors bring to builders and users of motor-driven equipment. Get the details on Life-Line's smaller size, lighter weight, greater strength and smoothness.

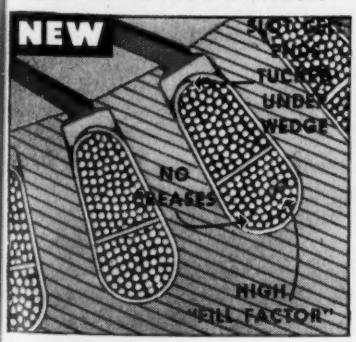
Life-Line motors, now built in sizes from 1-15 hp, are available from stock in standard and near-standard types. "Specials" in Life-Line design are available on short shipment. Other sizes and types—up to 200 hp—soon will be changed over to modern Life-Line design. Check your nearest Westinghouse office for deliveries—or write or wire today to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

J-21456

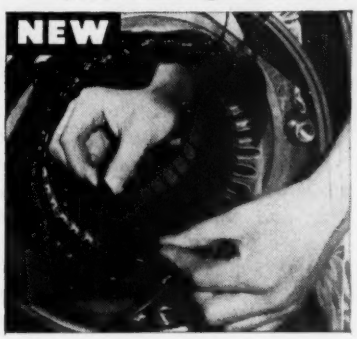
Westinghouse PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE *Life-Line motors*

Rectangular slot design leaves many unfilled pockets for dirt, dust and moisture to accumulate and cause deterioration.

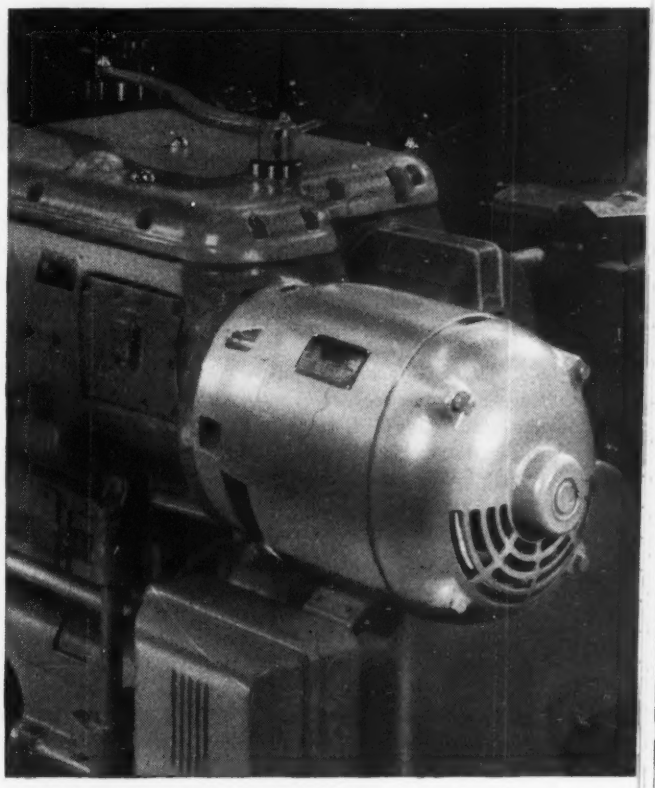
Old slot shape frequently required tapping last wires of the coil into position with resulting possible damage or weakening of insulation.



Pockets are eliminated—cell insulation is lapped over and covered by wedge. No sharp creasing of insulation is necessary.



Life-Line "pear-shaped" slots permit coils to be inserted snugly into position without need for tapping or weakening of the insulation.



LONGER LIFE ON THE JOB with freedom from electrical failures is assured by Life-Line motor manufacturing methods and new insulating materials.

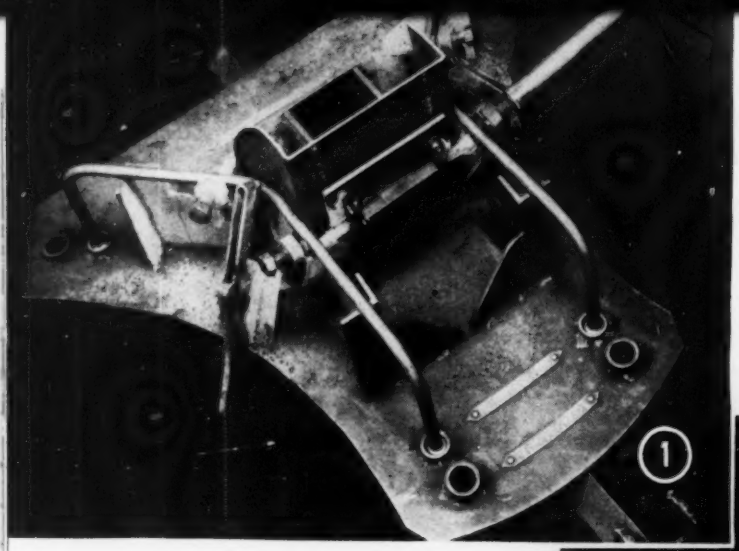
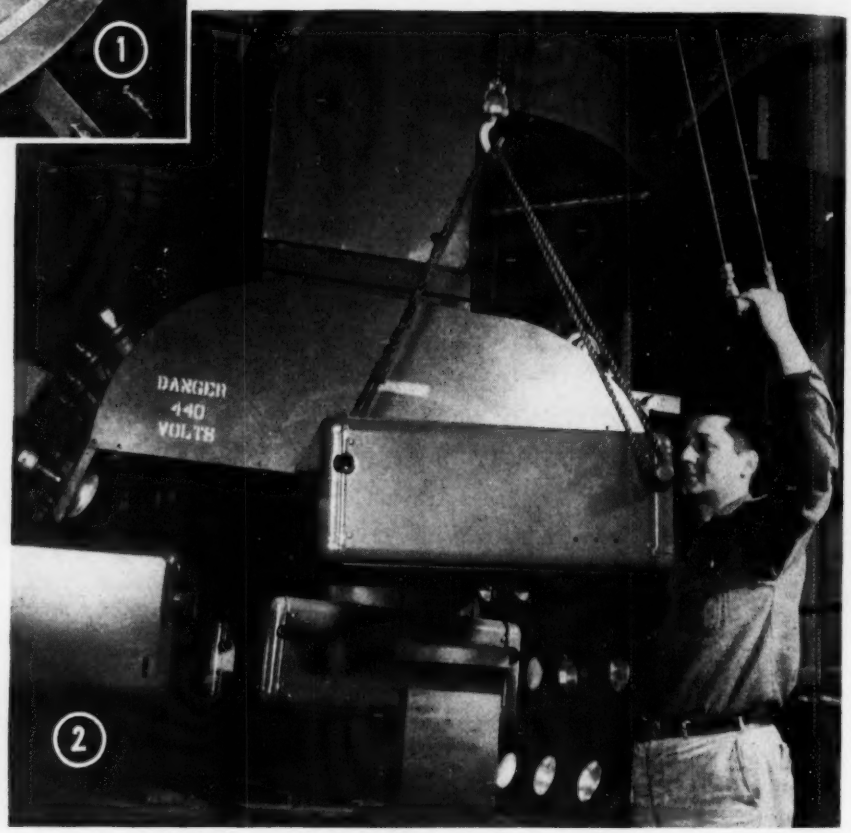


Fig. 1—Fixture for holding four arm bracket for welding. Two welding operations are needed to fabricate the unit

Fig. 2—Heater casing being moved into drying unit which consists of fifty 250 watt infra-red bulbs which are built into cylindrical walls. Unit is equipped with an axial flow fan for exhausting drying fumes



Revamped Fabricating Procedure

. . . cuts final assembly time of unit speed heaters

Design and tooling changes also simplify and standardize feeder line production of parts. Average cycle time at each work station reduced to 4 minutes making for a steadier flow of work

By L. E. BROWNE
Associate Editor, STEEL

REDUCING assembly time on 11 sizes of unit speed heaters by nearly one-half, from 63½ to 34 minutes, for the more standard models, Sturtevant Division, Westinghouse Electric Corp., Hyde Park, Boston, not only revamped final assembly procedure, but by design and tooling changes also simplified and standardized feeder line production of parts.

Major design improvements, contributing to lower assembly time, include a four-arm motor support steel bracket, which replaces a six-arm unit, and simultaneous forming of 8 holes in the cabinet inlet or back panel which eliminates individual drilling of 10 holes formerly required.

In fabricating the motor support, four brazing operations are replaced by two arc welding operations, and the four-arm support is automatically positioned with spacer nuts to inlet panel holes for the centering of the fan wheel, motor shaft, Fig. 1. The new practice in producing the inlet sheet gives 8 per cent more operating efficiency while the motor support savings in labor and material are substantially greater. Total saving for the entire assembly is 30 per cent.

Sliding Slot Channels — Better fit between casing sheets also results from improved practice in forming sliding slot channels for a Pittsburgh lock. It also aids in quality control, inspection and eliminates leakage of heated air from sides and corners. Elimination of the separate inlet ring which was spot welded to the back sheet was also helpful in cost reduction.

There are eight assembly stations in the final line divided into two sections. Average cycle time at each station has been reduced to about 4 minutes and flow of work is now steadier and smoother with congestion at various points eliminated. Formerly time elements varied considerably between assembly stations.

At station one, section one, cabinet casing and radiator are assembled in 2 minutes. About one-third of the drilling and riveting at station two is also assigned to this operator to maintain balanced cycle time. Use

Longer Life... Less Maintenance for PENN Truck Bodies with J&L JALLOY

HEAT-TREATED STEEL

J&L STEEL

Leading Dump-Truck Body Builder Pioneers Use of Heat-Treated Steel for Bottom Plates

Hockensmith Corporation, Penn Body Division, of Penn, Pa., puts real meaning in its slogan: "*Strength · Service · Economy*" by using J&L Jalloy and Otiscoloy steels.

J&L Heat-Treated Jalloy for truck bottoms resists the terrific shocks and abrasion encountered in heavy-duty operations, while J&L Otiscoloy High-Tensile Steel frame members and other parts reduce dead-weight to a minimum without sacrificing strength.

One mine operator reports that his stone trucks equipped with heat-treated Jalloy run an entire season without bottom replacements—an unheard of record in the mining industry where the materials handled are highly abrasive. In addition because longer wear reduces repair, his maintenance welding crew has been cut *84%* since using Jalloy!

J&L Jalloy is a *modern* steel for products that must be tough and strong—heavy-duty truck bodies, power-shovel buckets, dump-cars, bulldozers, scrapers, rock crushers, sand-blast equipment, and wherever abrasion is a limiting factor in the life of a product.

J&L Jalloy—a fine-grain, heat-treated steel—has an inherent ability to withstand impact and abrasion. A wide range of physical properties, with strengths up to *155,000 lbs. per sq. inch*, are available.

If you need a steel with *better* abrasion resistance, or if you want longer life from products made of steel, let us send you data on J&L Jalloy, including information on properties, heat-treatments and workability. The data booklet: "Jalloy—J&L Alloy Steel" is available on request. Use the coupon.

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Please send me complete data on Jalloy and the booklet: "Jalloy—J&L Alloy Steel."

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NEWCOMB-DETROIT

WATER TUBE SPRAY BOOTH WITH *Built-in Fan*

PRE-ASSEMBLED FACTORY-TESTED UNITS

Newcomb-Detroit brings to the finishing industry another important first*—the pre-assembled Water-Tube Spray Booth with built-in fan. Newcomb-Detroit Water-Tube Spray Booths are 90% assembled at the factory and are given trial runs before shipment . . . only the stack and spray area enclosure are shipped "knocked-down." This eliminates 80% to 90% of the assembly time normally required at the point of use and also assures maximum efficiency at first operation.

Water-Tube Spray Booths contain a series of tubes through which the paint-laden air passes after going through the water curtain. Each tube contains two clog-proof nozzles which spray a large volume of water against the flow of air. Air then passes through moisture separators and enters the built-in exhaust fan . . . clean—free of paint and moisture. The efficiency of these pre-assembled units has been proven in the plants of leading manufacturers throughout the U. S.

Send for descriptive catalog which gives complete details on construction and operation.

**In 1924, basic patent No. 2,097,253 was issued to Newcomb-Detroit Company on the first water curtain spray booth.*

ENGINEERED FINISHING SYSTEMS

Newcomb-Detroit is one of the pioneers in the field of engineered finishing systems for all types of industry. These systems include equipment for metal cleaning, painting, drying, dust collection, air processing and whatever other operations are needed to turn out flawless, economical finishes on any product. Have our engineers consult with you on your own product finishing.

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Grand Rapids Division—Plant
GRAND RAPIDS, MICH.

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of a more efficient air-driven drill saves about 1/3-minute in drilling 16-20 holes, 3/16-inch in diameter for steel rivets of United-Carr snap fastener type. Back or inlet sheet, louver frame, left and right support sheets, top and bottom covers and radiator are assembled here. Work starts on a roller conveyor at this initial station and continues through to the crating and shipping stand.

Heater cabinets are fabricated from No. 18 or No. 22 gage pickled and oiled, hot-rolled sheets, depending on model and size. Formed sections arrive for assembly coated with green zinc chromate paint, reducing cleaning to barest minimum for spraying and other surface treatment.

Change in Assembly — Unit parts are mechanically pressed into ultimate position and tension plates are adjusted and secured at the next station. Formerly interlocking sheets were assembled into position mechanically at station one, but improvement in fit of locking slots and channels eliminates need of this equipment. Time required for station two assembly work averages nearly 4 minutes with aid from operator No. 1 to maintain cycle time.

At station three, five to seven louvers are attached depending on the size of unit being assembled. While at this station masking paper is attached to protect aluminum fins on heating element during spray painting. Time requirements are about 5 minutes for six louvers and slightly less for five.

Infra-red Drying — Heater casing is spray painted at the fourth station with a quick drying green lacquer paint, Fig. 2. Unit is raised by electric hoist from conveyor, hand-sprayed evenly and moved into an open, infra-red drying unit designed by Sturtevant engineers especially for this service. It consists of fifty 250-watt infra-red bulbs built into the cylindrical wall of the unit and is equipped with an axial flow fan for exhausting drying fumes. The spray painted surface is dry in 3 minutes. Spraying, drying and lowering of unit to conveyor level consumes 4 minutes. This includes flipping over of louvers for even coating of adjacent surfaces. Actually the paint is dry in one minute, the extra time is allowed for setting and hardening. Total time for the four main assembly operations in group one averages 18 minutes for a six louver heater.

After drying, section two takes over, completing assembly at the next four stations. At station five, unit has been removed from dryer

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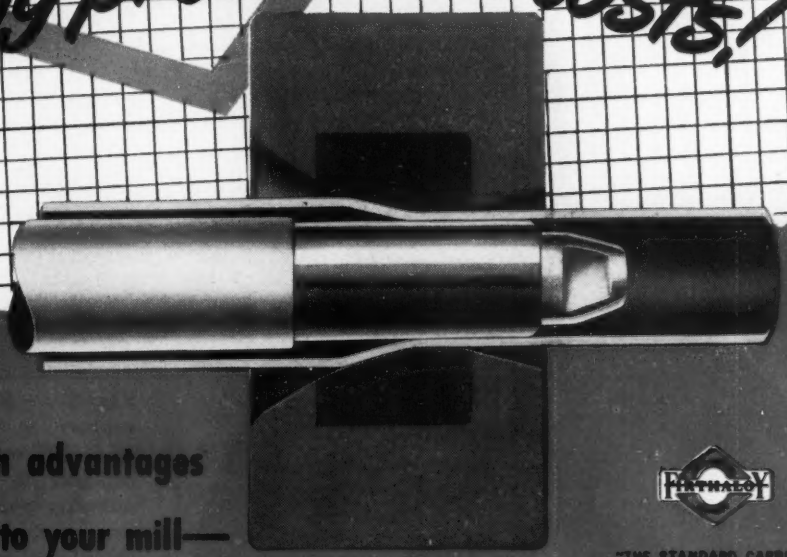

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Fig. 3 — Motor support, motor and wheel are assembled in 3¾-minutes. Support arms are positioned to center automatically in holes in the back panel to depth of spacer nuts

Fig. 4—Vibration speed, and quality control factors are checked during short test run after wheel is adjusted to shaft

and lowered to a pallet at original conveyor line level. Masking paper is removed from fins and louvers are secured. Screws are set with an air-driven screw driver, thus completing installation of louvers begun at station three. Louvers are in a horizontal plane as the heater moves on from this point, remaining in that plane until adjusted in service. Name plate is also attached. All this is accomplished in 3-3/4 minutes.

Key Assembly Point—Station six in many respects is a key point. Here the effect of redesign and tooling is demonstrated clearly by the assembly of motor support, motor and wheel in 3-3/4 minutes. The redesigned four-arm motor support arrives completed, with spacer nut already attached to each arm, Fig. 3.

Speed in the assembly of the motor, fan wheel and shaft to the supporting bracket brings into full play advantages derived from new design and tooling for the motor support and inlet casing sheet in feeder supply lines. The four support arms are positioned to center automatically to the holes in the back panel to the depth of the spacer nut. Motor with shaft adjusted is placed on the motor support base and secured by two over-hung clamps after the support is secured. Wheel is adjusted to the shaft and a short test run started with an electrical lead extension as shown in Fig. 4. Vibration, speed and other quality control factors are included in this test.

Feeder Line Assembly — In assembling the motor support on a feeder line each bar serves as two arms. It is welded to the motor saddle and the motor base is welded to the saddle and arm assembly. Spacer nuts on the arms limit and regulate the distance for attaching to the inlet sheet. Held to the mounting by clamps, the motor in effect operates on a resilient rubber base, reducing vibration.

To some extent the seventh station in the line is an adjunct to the one before and after. Motor cartons are formed and opened, motor support arms are rethreaded and the name plate is stamped. At this station preparations for final packing and crating are made. The heater is positioned on a palleted section of the roller conveyor and may be raised or lowered on a pneumatic lift table to the most convenient working level.

Heater Packing — For packing at station eight the smaller unit heaters in the range of 11 sizes, six complete packing liners are inserted, reinforced and secured. For the larger sizes, wooden crates are quickly assembled with wire-bound shooks, the unit is lowered into the crate frame and shooks are attached. Hardware for final installation is enclosed in the package, including fasteners in cloth bags and hangers tied to the crate frame.

In effect all packing and crating is done on and is a part of the assembly line. Formerly individual crates were built for each of the larger models as the unit reached the final station, requiring 20 to 30 minutes. Time is now reduced to eight to 12 minutes for the last two stations, seven and eight, both having to do with preparation and final packaging. Stations one and seven are normally group leader points and the men may be required to fill in anywhere to balance the line. For each of the 11 sizes, there is a set of dies and the improvement in die practice contributes to better fit in assembling the casing. New design also reduces accessory hardware needed.

Heater Series Redesigned — Entire Sturtevant unit speed heater series has been redesigned in the last year, part of a general overhauling at the Boston plant since Westinghouse took over, which to date has cost $2 million in less than three years. Around these changes the new speed heater assembly line has been built with assembly and fabrication of parts closely co-ordinated. The new design, des-

ignated as Design 14, includes 11 sizes with the following capacities: 25,800 to 300,500 Btu, 108 to 1252 equivalent direct radation units and 398 to 5200 cubic feet per minute.

Heaters are of the suspended type for commercial and industrial installation. Speed heaters begin delivering heat automatically as soon as steam is introduced and motor started. Through adjustable louvers, the motor-driven fan forces heated air down to the desired working level at any angle. Inlet and outlet pipe connections on both sides permit direct piping runs. For simple but flexible mounting requirements, two soft steel hangers which can be readily bent to fit all mounting problems go with each unit. Installation directly to the ceiling is possible due to flat top construction. Operating costs are lowered by improved aerodynamic design, leak-free construction, whirl-free inlet and curved propeller blades.

The heating element or radiator, arriving at the assembly line completely fabricated and ready for installation, is constructed of seamless orificed copper tubes, brazed into cylindrical steel headers in a single row design. This results in one-piece rugged unit capable of withstanding pressures up to 200 pounds per square inch and temperatures to 400° F. Copper tubes are mechanically expanded into smooth aluminum fins. A permanent bond assures unrestricted heat flow from tubes to fins with maximum heat transfer. Special heating elements are produced for some heaters, including a low-temperature type with a special radiator giving low final air temperature and one designed to serve with a forced circulating hot water system.

Die Formed Blades — Propeller fan is made of three die-formed aluminum blades riveted to a steel hub. The design provides for a predetermined camber and increasing pitch giving a true warped surface. Air moved by the fan is distributed uniformly through the radiator. The angle of the variable pitch blade increases gradually from a minimum at circumference to maximum at the hub.

Heater fan wheels are powered by Westinghouse enclosed resiliently saddle mounted motors with waste-packed sleeve bearings, attached to the cabinet by support arms. The four-arm design mentioned previously has contributed much to increase efficiency in assembly and operation. Motor speed controls are employed to regulate heater operation to increase economy in some cases. Control by thermostat is also attained with simplified wiring. Steam supply and return headers are threaded on both

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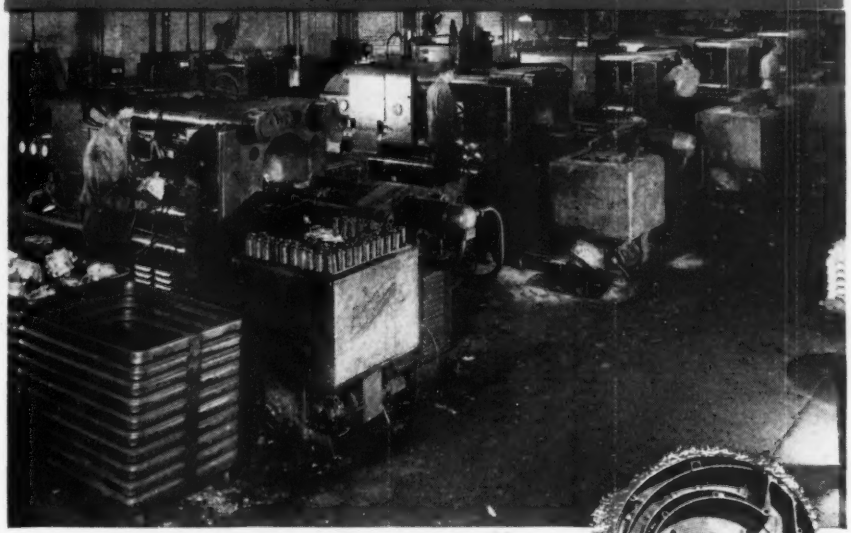

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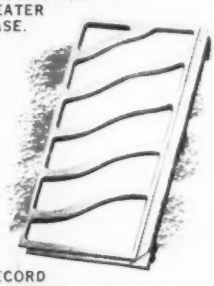

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Why remove metal by chips, or employ antiquated casting methods, when you can do it the easy way? Whether you are a custom die caster, or one who "makes his own", you can't beat H-P-Ms for getting precision metal parts quick and at a reduced cost. Call in a nearby H-P-M engineer. Let him show you how die castings will give your production profits a boost.

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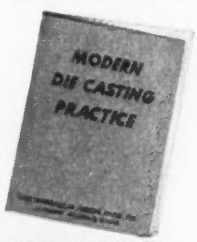

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When You're Using the *Right* Wheel on Each Job

And it's easy to use the *right* grinding wheel—the economical wheel—when you're buying Norton. Here's why:

1. ***The completeness of the Norton line***—The wide variety of types of Norton wheels, the many abrasives and bonds, the wide range of grains, grades and structures—they make it possible to provide a wheel with the correct grinding action for ***each job*** in your plant.

2. ***The country-wide Norton engineering service***—It's not enough to have the right wheels—they must be correctly selected for your grinding jobs. There are Norton abrasive engineers in every industrial center—highly skilled men who know how to solve your grinding problems. Back of them is the Worcester staff with its experts in various types of grinding. And supplementing the Norton field force are the abrasive specialists of Norton distributors—men who have been factory-trained at Worcester so that they really know grinding wheels.

Let a Norton engineer or a distributor's specialist select from the complete Norton line the *right* wheel for each of your grinding jobs. *You'll find that you really can grind for less.*

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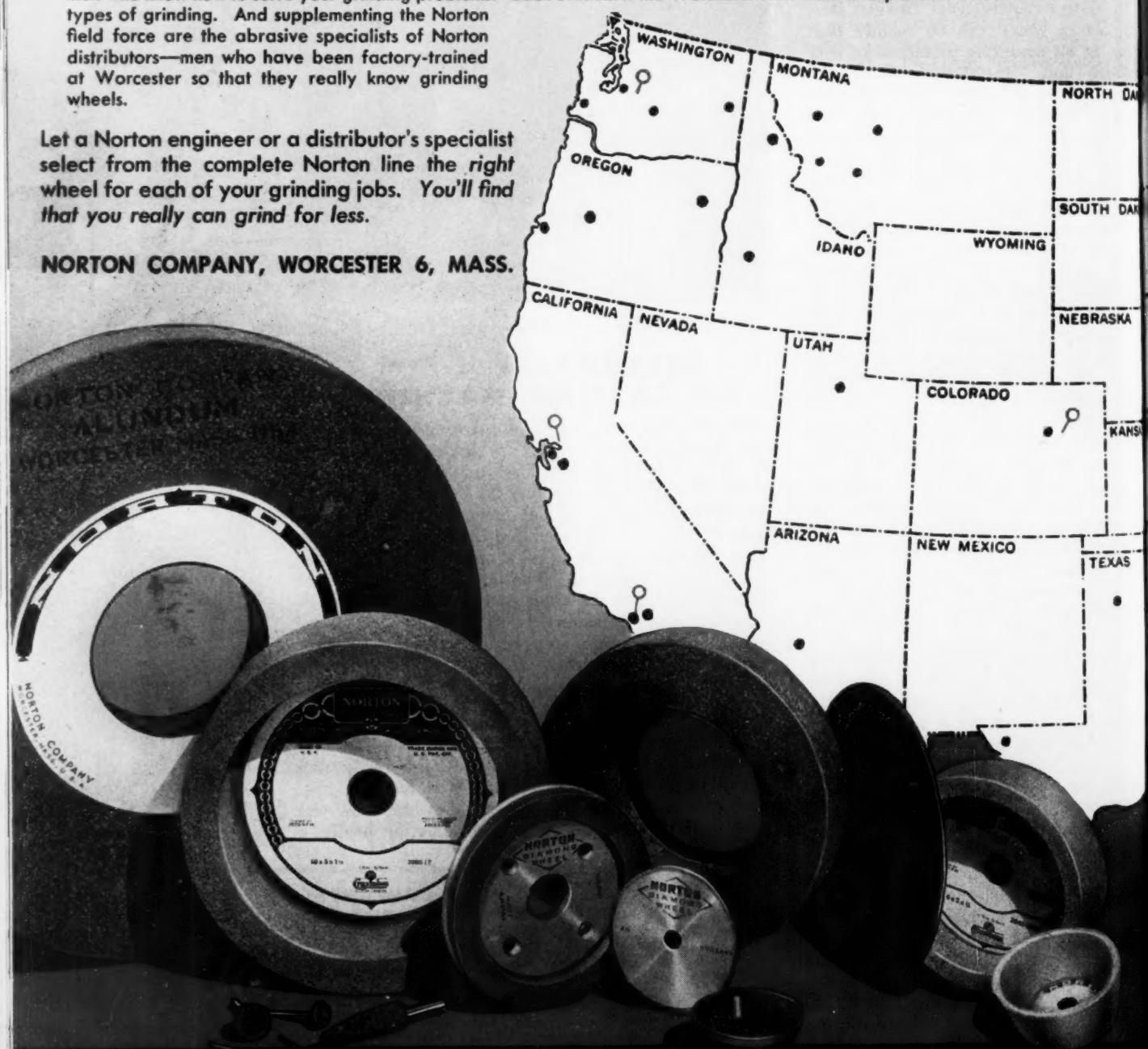
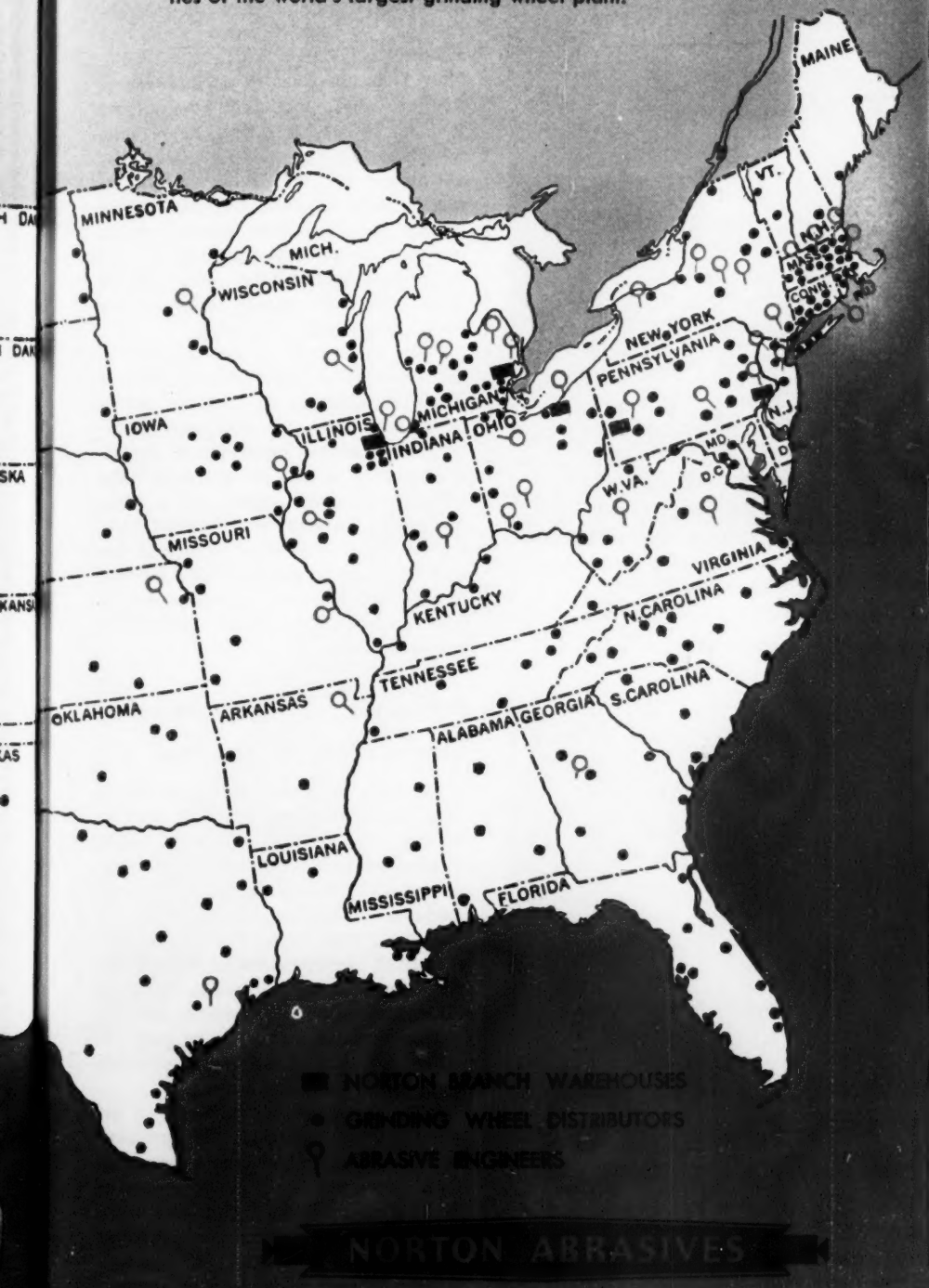


NORTON GRINDING WHEELS
Are Handy to You

In over 200 cities from coast to coast there are Norton distributors with grinding wheels on their shelves—many with thousands of wheels.

Back of them in five strategic locations, are the Norton warehouses illustrated at the right—staffed and stocked for prompt service.

And back of them there's the Norton factory stock at Worcester of over 3,000,000 grinding wheels—backed in turn by the manufacturing facilities of the world's largest grinding wheel plant.



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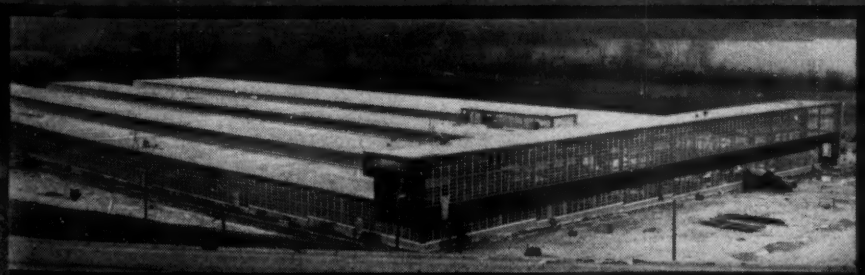

This newest Worcester unit, with a floor space of nearly five acres, is just about complete and the installation of machinery and equipment has started. When it goes into operation it will still further increase Norton grinding wheel production facilities.

MORE and more important fabricators, who regularly specify Murex electrodes to obtain superior welds, are discovering there are extra dividends when M & T accessories are on the job too.

Top quality M & T holders, helmets, shields, connectors, cleaning tools, protective clothing and other essentials in the line are worthy teammates of Murex with proved performance records. Together they provide improved, safer, more economical, speedier welding.

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ends. They can be connected to the handiest side with minimum of piping. Hot water units have only one supply and one return connection.

Abrasive Wheel Safety Code Revised

Revision was made recently in the safety code for use, care and protection of abrasive wheels to bring it into line with current practice according to an announcement by American Standards Association, New York. Because of an increase in use of small mounted wheels and points, two new tables have been added to the standard to cover critical speeds for wheels and points using $\frac{3}{32}$-inch spindles. Slightly higher speeds for dish and saucer wheels are now permitted. Diamond wheels have been subdivided into groups with different speeds allowed for each.

Rule governing minimum spindle diameters for various sizes of wheels has been changed so that the tables of spindle sizes are advisory rather than mandatory. Additions to appendix include a set of sketches with notes describing most common causes of failure of threaded hole wheels of cone or plug type, and descriptions of an adapter type mounting for cup wheels on portable grinders and rubber faced protection washers.

Poisonous Plating Waste Elimination Is Studied

Problem of destroying cyanide in large volumes of waste water used as a wash in plating plants is being studied at Yale University as a project set up by American Electroplaters' Society, Jenkintown, Pa. Object of the study will be to find economical means of purifying waste waters before dumping into streams. Several alternate methods are under investigation because large plants may require different purification methods than small ones.

With the increase in volume of industrial electroplating, the problem of waste disposal is ever increasing. Cyanide is one of the most poisonous plating room wastes and even very minute concentrations are sufficient to kill fish. Following the cyanide study, other poisonous waste problems will be investigated.

—o—

Latest revisions of the commercial standard for porcelain enameled steel utensils are contained in a pamphlet announced recently by National Bureau of Standards, Washington.

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Keller Tools on Production Line in RCA Corp. Plant

KELLER *Pneumatic Tools*

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DRAVO

Industrial Hygiene

(*Continued from Page* 113)

of contaminants under investigation. However, in the case of nuisance dust and fibrosis producing dust, an actual count of the number of particles is required. To accomplish this, a small sample of the liquid containing the collected dust particles is allowed to settle in a specially designed glass cell which is then placed under a microscope. Here definite areas representing 1 cubic millimeter are blocked out, and the actual number of dust particles in several of these areas is determined by regular counting. To facilitate and speed up the counting, the image on the stage of the microscope is transferred to a large screen by means of a micro projector.

In an industrial city atmosphere the number of dust particles is generally in the order of one half to two millions per cubic foot of air. For plant atmospheres, however, the dust content varies considerably.

Counting Dust Particles

Most industrial air-borne dust has a particle size less than 5 microns (1 inch = 25,000 microns). The equipment used in routine dust counting will take in particle sizes from a little under 1 up to 10 microns. Particles larger than 10 microns will settle out quickly in the immediate vicinity of the point of origin.

Determination of the free-silica content in the dust is of utmost importance and requires special equipment. Most of this work at Bethlehem is done with the petrographic microscope, but the use of x-ray diffraction methods is also being considered.

Colorimetric methods are effective in determining minute quantities of many chemical compounds and are therefore used extensively in industrial hygiene work. The actual amount of a colored chemical compound contained in a solution may be quickly and accurately determined by comparing it with a similar solution of known concentration. Such comparisons are frequently carried out by visual observation, but in many cases a spectro photometer is used. In this instrument a photoelectric cell, far more sensitive to color variations than the human eye, is employed in making the comparisons.

The laboratory is also equipped with a gas chamber, used in producing known concentrations of various gases and dusts for calibration of field instruments. Gas meters or air-flow meters of several types are used to calibrate or measure the sampling rate of different sampling equipment.

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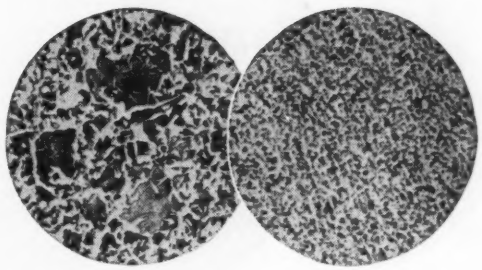

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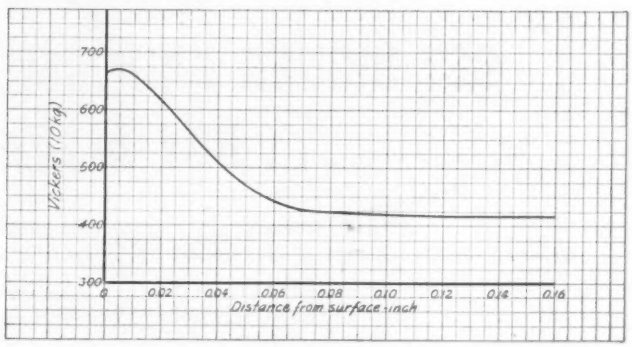
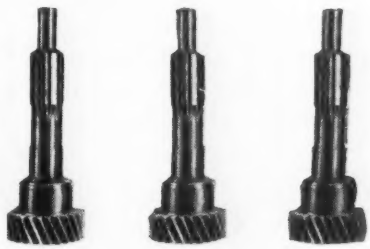


Hardness penetration graph of Chromium-Vanadium A 6120 steel, with a light case (0.80–0.85% carbon) in outer .010 inch

EASE OF PROCESSING—Uniformity of vanadium steels from heat to heat, with easy and uniform response to thermal and mechanical treatments, brings large compensation—savings far over-shadowing differences in initial materials costs.

Our metallurgists will be glad to assist you in the application of vanadium to meet your requirements.



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A well-equipped repair shop is provided for the proper maintenance and care of the complex equipment used both in the laboratory and in the field, and for building special equipment not available commercially.

Besides operating the laboratory the industrial hygiene staff is constantly engaged in studies of technical processes and methods of production, making recommendations for improving and redesigning equipment wherever this will provide increased comfort and more healthful working conditions. They also make studies of the materials used, in order to eliminate possible hazards from that source.

Localized Industrial Feeding Has Advantages

Food prepared at the best central commisary and trucked from place to place in the very finest equipment can't stack up with freshly cooked dishes served right on the spot, was the view expressed by Arthur B. Dreissiger, manager of Factory Stores, Cleveland, in a round table discussion of industrial feeding problems at recent National Restaurant Association convention in Cleveland. Most of the advantages of centralized operations without sacrificing those things which make food more appealing and invaluable to industrial workers can be gained by attention to intensive training in every category of purchasing, preparation and pricing.

Material Testing Meeting Will Be Held in Detroit

An exhibit of testing apparatus and equipment will be held in conjunction with the 51st annual meeting of American Society for Testing Materials in Detroit, June 21-25. Many of the leading companies in testing and scientific instruments, laboratory, and related industries will show their latest developments and indicate the wide range of equipment available for conducting tests and for research and laboratory work.

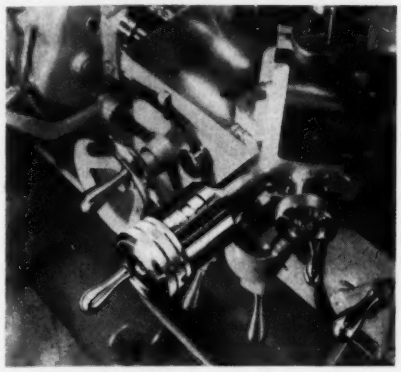
During the 5-day meeting, a total of 19 sessions will be held covering a variety of fields. Several of these sessions will be held at the same time in fields that are not interrelated so that all persons attending the meeting may get the greatest benefit in the shortest possible time.

Papers will be presented by men from industry, research laboratories and universities. They will cover specific applications as well as the underlying theories of certain types of research.

New Products and Equipment

Micrometer Dial

With the new dial on the TriSet direct reading micrometer cross feed dial, manufactured by Springfield Machine Tool Co., Springfield, O., any one of three individual direct readings may be selected for turning, boring or depth of cut. All three direct



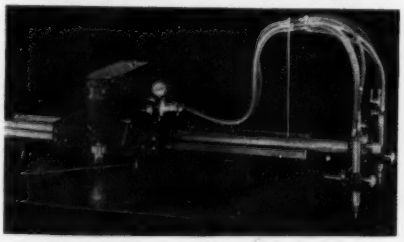
readings are combined in the one indicator.

Direct readings in thousandths of an inch are given through individual windows selected with a knurled ring at the front of the indicator housing. For accuracy, only one window with one set of graduations is exposed at any one time. Each of three readings is given on the one dial through its own window. Dial is available on all new Springfield lathes and may be installed on older models.

Check No. 1 on Reply Card for more Details

Shape Cutting Machine

Available in sizes 36, 48 and 60 inches wide and 6 or 12 feet long, the model S shape cutting machine, built by Gasco Equipment Co., 3253 North Kedzie Ave., Chicago, Ill., is



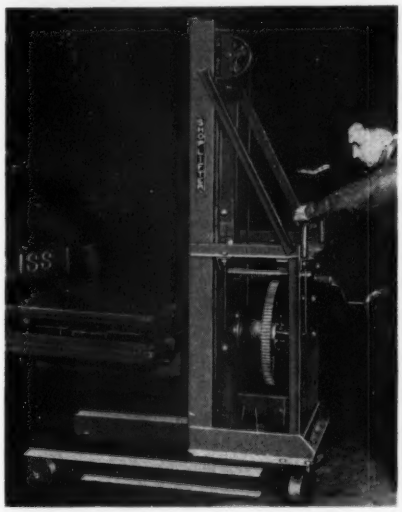
both dirt and weatherproof and operates through a 4-speed transmission. Features include torch mounting on either or both sides of table, cutting pressure control, tracing, template, magnetic and circle cutting, sealed bearings and remote controls.

Standard speed range is from 2 to 40 inches per minute. Machine operates on 110-120 volts, alternating or direct current and is supplied with a 6-foot track. Standard torch holders are equipped for 24 pitch, with 32 pitch available on special order. Machine is designed for use with three-hose cutting torches, with gear rack attached.

Check No. 2 on Reply Card for more Details

Shop Elevator

Heavy duty type DX portable elevators, offered by Economy Engineering Co., 2653 West Van Buren St., Chicago, Ill., are made in 1000 and 2000 pound capacities. Features of the Shoplifters include ball bearing hand power hoist unit, automatic



holding brake, safety ratchet and pawl which automatically holds the load and use of ball bearings to minimize friction in operation. Under full load a crank handle pressure of 20 pounds will elevate or lower a load.

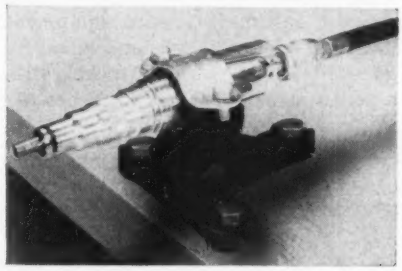
Elevators will pass through a 6-foot 8-inch high door 25 inches wide. Each model has two 5-inch diameter basewheels under the platform and two 6-inch swivel casters at the opposite end, plus a push bar for steering. A foot-operated floor lock is included.

Check No. 3 on Reply Card for more Details

Tool Mounting Fixture

All types of portable mounting tools may be accommodated by the model 7101 tool mounting fixture announced by Aro Equipment Corp., Bryan, O. It is suited to screw driving and nut setting jobs where it is more practical to bring the assembly to the tool. Fixture is adjustable to any position.

Aro air tools from the small size drills, grinders, screw drivers, etc., to the large ½-inch drill may be accommodated. Drilling and reaming jobs, rotary file work and other production jobs can be handled. Its



clamp, adjustable with standard wrenches, is designed to hold various diameters.

Check No. 4 on Reply Card for more Details

Arc Welding Machine

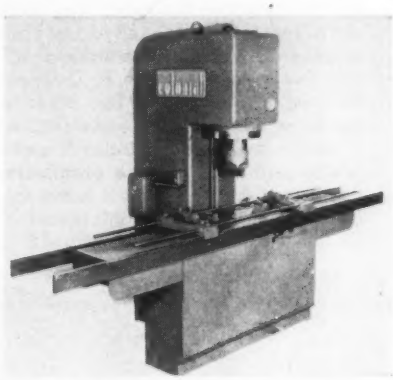
Wasp Special air cooled, engine-driven arc welding machine, announced by Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y., is designed to furnish a smooth steady current and to stand up under usual and regular duty factor load conditions in varied applications. The 200 ampere welder has a welding range of 25 to 250 amperes at 30 volts, 50 per cent duty cycle.

It is a light weight machine, adaptable for work in places inaccessible to larger equipment. Two outlets are provided for lighting purposes or to operate universal power tools in an emergency.

Check No. 5 on Reply Card for more Details

Straightening Press

Designed for handling both finished and rough work, the new 75-ton model PS-75-12 hydraulic straightening press, made by Colonial Broach



Co., P. O. Box 37, Harper Station, Detroit, Mich., employs a double rail straightening fixture for the heavier

work for which the press was developed. Reinforced welded steel construction is used for the open side frame design.

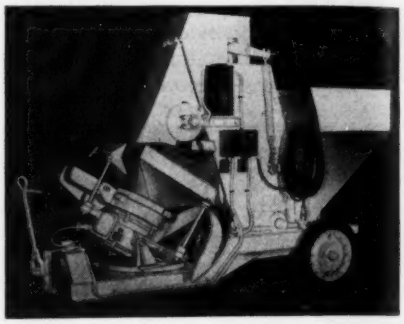
Motors are built in and rams are direct acting from high capacity hydraulic cylinders mounted in the head. They are available with bronze ram noses in place of standard steel design, if desired. Same is true of work support anvils. Standard equipment includes hand controls and pressure gage. Stroke of ram is 12 inches, with a power stroke speed of 45 inches per minute. A 15 horsepower, 1800 revolutions per minute motor operates the hydraulic system.

Check No. 6 on Reply Card for more Details

Sand Preparation Unit

Beardsley & Piper Division of Pettibone Mulliken Corp., 2424 North Cicero Ave., Chicago 39, Ill., is producing a portable sand preparation unit, the Junior Nite-Gang, which provides magnetic separation, thorough screening and aeration of molding sand. Intended for use in the small foundry, the machine may be pulled or pushed to any floor in the foundry and plugged into a receptacle for operation.

Bucket elevator raises the sand and discharges it over the magnetic separator, then drops it into the Screenarator unit where it is screened,

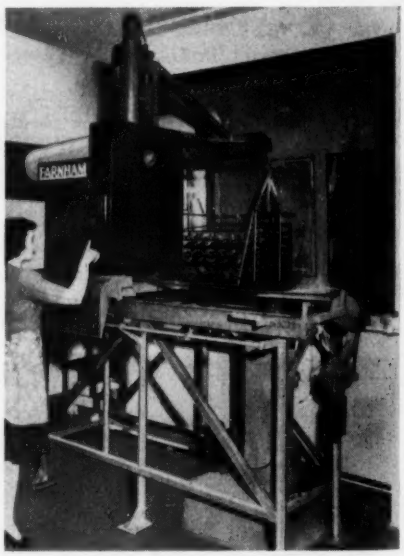


aerated and discharged at a rate of 20 tons per hour, anywhere within a radius of 25 feet and 160 degrees. It will discharge into a head, windrow or container while operator is refilling its ¾-cubic yard hopper.

Check No. 7 on Reply Card for more Details

Dipping Machine

Farnham Mfg. Co., 1046 Seneca St., Buffalo 10, N. Y., has developed a completely automatic dipping machine for applications in plating, painting



and other industries. Basket of machine is loaded and lowered into the first tank, where it is agitated for a predetermined and adjustable period of time; then it is automatically lifted and moved to the second tank for a predetermined period of agitation. Basket is then returned to the first tank and the cycle repeated until the operator stops the machine.

Machine illustrated operates over

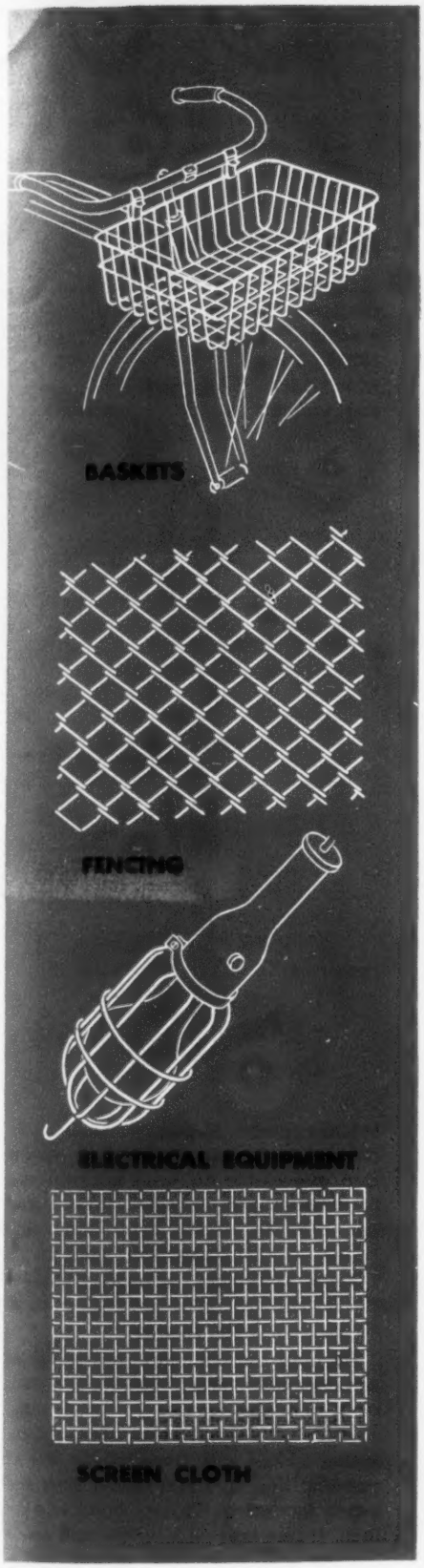
IF you're looking for a heavy-duty, rigidly constructed, all-purpose press for assembly and disassembly of large gears, rolls, armatures and similar parts in general machine shop work, it will pay you to consider the R. D. Wood Hydraulic Wheel Press. This press requires no pit, and it has self-contained pumping unit and controls. A pneumatic pull-back device eliminates counterweights and gives a faster rate of ram return than is obtainable on ballast-weighted devices. Years of R. D. Wood design ingenuity are built into this press . . . your assurance of quick, economical, *dependable* performance of vital general shop work. These Wheel Presses are available in capacities ranging from 100 tons to 1000 tons, with tie-bar clearances ranging from 48" to 120". Send for literature *today*, and remember R. D. Wood engineers are always available for consultation on *all* hydraulic press problems.

HYDRAULIC PRESSES AND VALVES FOR [illegible] PURPOSE • ACCUMULATORS • [illegible] • INTENSIFIERS

EST. 1803

R. D. Wood Company

PUBLIC LEDGER BUILDING, PHILADELPHIA 5, PA.



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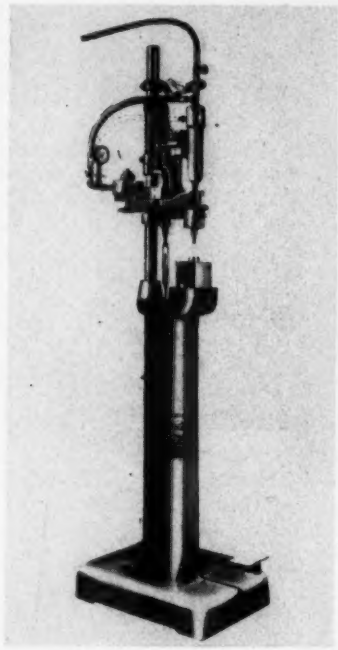
Automotive Bearings
Bronze Bars
Bronze Castings

two tanks, but any number of tanks can be arranged for machine activity. Equipment can be operated on full automatic, semiautomatic or manual control. An emergency button stops it at any point in the cycle.

Check No. 8 on Reply Card for more Details

Riveting Machine

Hammer action and rotation are combined in the pneumatic riveting machine, made by Schlack Mfg. Co., 13255 Birwood, Detroit 4, Mich., which operates off both line pressure and exhaust air from the four interchangeable capacity heads. To change from line to exhaust operation, the motor air hose is connected to exhaust port in side of head and line port is closed. Interchangeable heads with capacities of 3/32, 5/32, 1/4 and 5/16-inch, based on mild steel rivets, produce 4000 to 10,000 short stroke blows per minute.

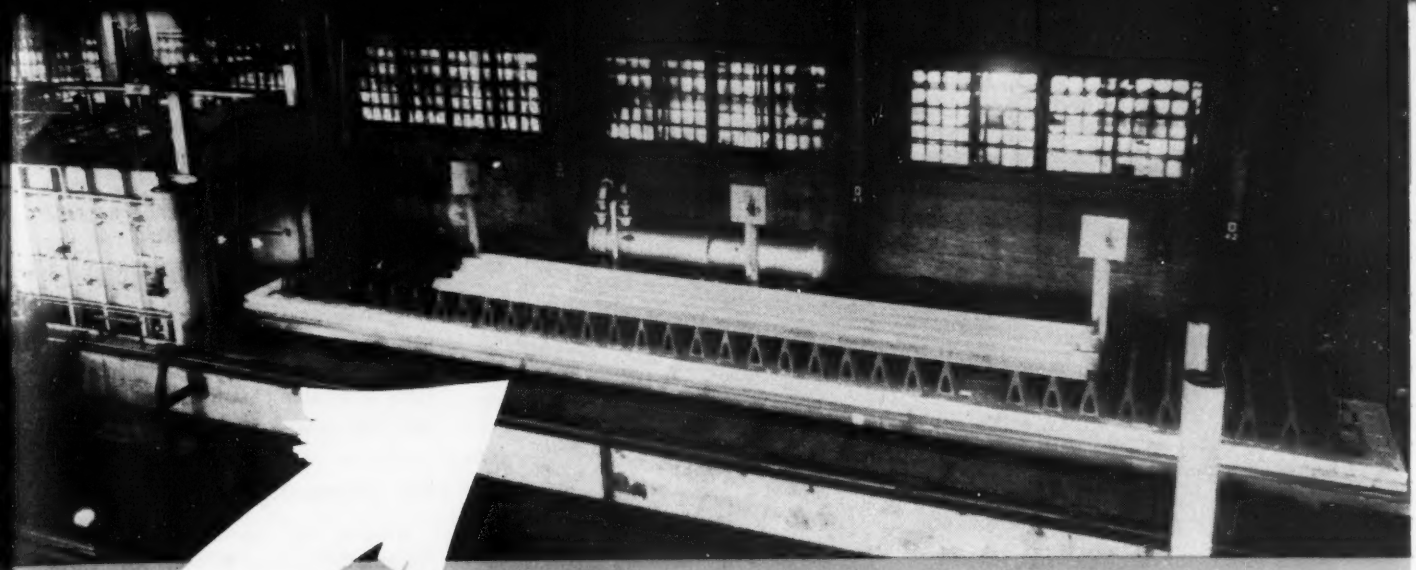


Peening tools mounted on taper of spindle can be supplied to form round, oval and flat heads, to peen pins, studs, shafts, and tangs and to furl, stake, swage and flare. Model PS is pedestal mounted and model PSB for bench mounting. Throat depth is 4¼-inch, frame travels 2 inches and anvil heights 40 (model PS) and 6 inches (model PSB).

Check No. 9 on Reply Card for more Details

V-Belt Clutch Pulley

A self-contained V-belt clutch pulley with the pulley an integral part of the clutch assembly offers quicker release, reduced belt wear, smoother



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Automatic Car Bottom FURNACE

hardens and draws bars from 5" to 9⅝" in diameter, and from 30' to 54' long.

Produces Straight bars of uniform hardness and mechanical properties.

Improves Machinability by providing straight bars of maximum uniformity.

Eliminates Abnormal stresses—cracking and distortion.

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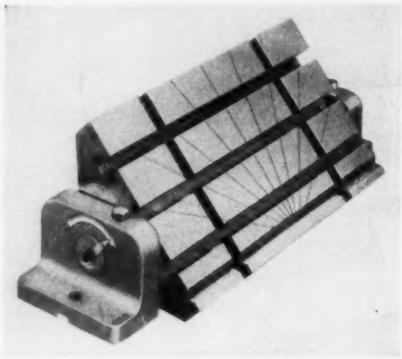
starting, easier take-up for wear and compactness, according to Edgemont Machine Co., 2141 Home Ave., Dayton 1, O. Its strength and design permits application in small portable conveyors, road markers, cultivators, etc., using V-belt or chain drives.

Clutch is furnished in ratings of ¼ and ½-horsepower at 100 revolutions per minute and in shaft sizes from ¾ to 1¼ inches. V-belt pulleys with one "B" groove of 3½, 4¼ and 5-inch diameter or with two "B" grooves of 4¼ or 5-inch diameter are available. Special V-belt pulleys, or adapters for mounting sprockets or gears are offered.

Check No. 10 on Reply Card for more Details

Milling Work Table

A more flexible tool is made of the milling machine with the universal work table which is made by Malnar Machine & Tool Co. Inc., 19301 St. Clair Ave., Cleveland 10, O. Fastening quickly and securely to any milling machine, the table, measuring 9⅛ x 16⅞-inches, enables the operator to tilt the work from 0 to 45 degrees in either direction and lock it at the desired angle. Dial calibrations make it easy to change work position and then return it to



the exact previous position without removing the work from the table.

Check No. 11 on Reply Card for more Details

Metalworking Bandsaw

Four-wheel design which provides a throad depth of 27 inches is a feature of the bandsaw for the high speed cutting of metals, plastics and other materials, produced by T. Farrell Machine Co., 2835 San Pablo Ave., Berkeley 2, Calif. Cutting capacity is 12½ x 27 inches and the 18 x 24-inch table tilts 45 degrees right and 10 degrees left. An auxiliary table 16 x 18 inches is furnished. The four wheels are 12 inches in diameter. Blades are 10 feet 4 inches long and from ⅛ to 1 inch wide.

Blade speeds on the standard model are 550, 1050, 1750 and 2700 feet per minute. A low speed model is available with gear drive offering a range of speeds starting at 65 feet per minute. Sealed factory lubricated antifriction bearings are used throughout. Base and table castings are grey iron.

Check No. 12 on Reply Card for more Details

Air Clamp Jig Base

Faster and easier operation and automatic compensation for variations in work thickness are advantages of the air-clamp jig base made by Industrial Clutch Corp., Waukesha, Wis. Time is saved by limiting the clamp throw to just enough to permit easy insertion and removal of work. Repetitive operations on similar pieces require only the sliding of the piece into position on the base under the jig plate, turning on the air, drilling, turning off the air and removing the piece.

Each of the four sizes made will accommodate several sizes of jigs having bushings so spaced that they will

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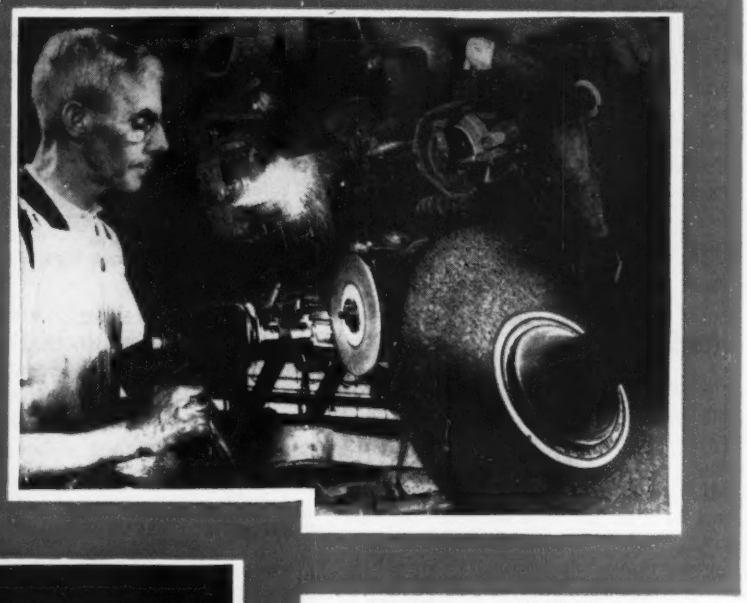
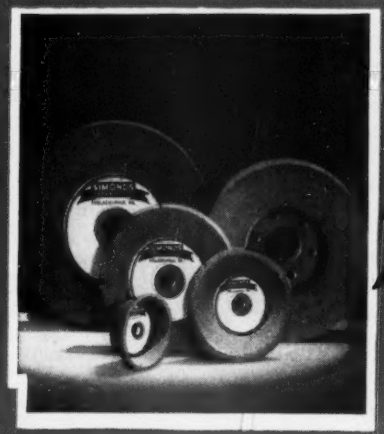
the grinding job

Grinding with efficiency and economy on the production lines of American Industry . . . from precision finishing a wide variety of component parts for the automotive industry to rough snagging castings and billets in foundries and steel mills. *Every industrial plant uses grinding wheels!*



the wheel

Simonds Abrasive Co. Borolon and Electrolon Grinding Wheels vitrified, silicate, resinoid or shellac bonded . . . in every required size, shape and grain and grade specification . . . fast cutting, long lasting—for extra efficiency, top economy on every grinding job.



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Every size and shape for every grinding job . . . centerless, crankshaft, cut-off, cylindrical, internal, knife grinding, mounted points, portables, roll grinding, saw gumming, snagging, surfacing (wheels and segments), tool and cutter, bricks, sticks, stones and abrasive grain for polishing, pressure blasting, anti-slip, etc.

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From your Simonds Abrasive Co. Distributor located in all key industrial centers here and in many foreign countries. He carries local stocks and can advise on grinding wheel selection. Write today for our Grinding Wheel Data Book, 112 pages of practical information about grinding wheels and their uses. Also contains name and address of distributor serving your area.

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You can count on the utmost efficiency when you use Simonds Abrasive Company grinding wheels—products quality controlled from the crude abrasive produced by our own electric furnace plant, Simonds Canada Abrasive Co., Ltd., to the finished wheels, tested and ready for top performance—efficient production tools backed by their manufacturer's experience as a major manufacturer of grinding wheels and abrasives exclusively for over 50 years. For consistently high quality results, use Simonds Abrasive Company wheels.

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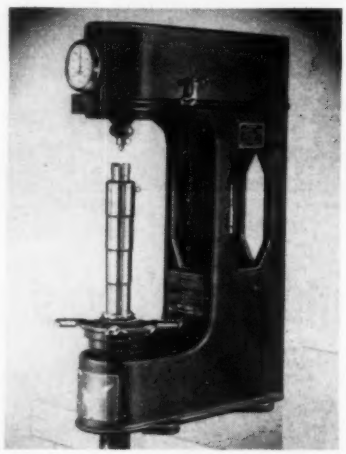
go over the posts of the base. A 50-pound minimum air pressure is necessary for operation. Clamp base is aluminum and top plate is of high strength nichrome cast iron with top and bottom ground parallel. Posts are of hardened steel operating in hardened and ground steel bushings. Operating lever opens and closes a three-way, ball type valve. Sleeve spacers or inserts are provided by the user and kept for each job.

Check No. 13 on Reply Card for more Details

Hardness Tester

Depth of penetration of 0.005-inch or less qualifies the superficial hardness tester, made by Clark Instrument Inc., 10200 Ford Rd., Dearborn, Mich., for testing surfaces that cannot be marred. It is suitable for testing surface hardened steel, very thin metals, rolled sheet metal or very small areas. Another use is for standard rockwell testing of metals.



Instrument is offered in three models, with 8, 12 or 16-inch vertical capacity. Equipment included with tester includes formed and lapped diamond cone penetrator 1/16-inch steel ball penetrator, standard 3½-inch anvil checking "V" and raised "V" anvils and test blocks.

Check No. 14 on Reply Card for more Details

Riveting Machine

Snyder Tool & Engineering Co. 3400 East Lafayette, Detroit 7, Mich., is building an automatic machine which inserts 12 rivets in an automotive wheel assembly, located on a fixture. Operation thereafter is entirely automatic. Six automatic feed hoppers are provided which feed the rivets down to the wheel assembly where hydraulically actuated plungers pick the rivets out of the hopper chutes and carry them to the pierced rivet holes in the assembly.

Six rivets are inserted simultaneously and the wheel assembly is then indexed 180 degrees and the remaining six rivets inserted, completing the assembly cycle. Production is 200 wheel assemblies per hour at 80 per cent efficiency. Floor space required by machine is approximately 45 x 57 inches.

Check No. 15 on Reply Card for more Details

SOLENOID VALVE: With effective orifice area equal to that of the pipe line, the DS-2 direct operated solenoid valve, designed by Airmatic Valve Inc., Cleveland, O., requires no pilot for operation. Its removable rubber seat provides a leakproof seal for handling of oil water, steam, air or freon.

Check No. 16 on Reply Card for more Details

INDUSTRIAL DETERGENT: Controlled sudsing is a feature of MXP synthetic industrial detergent developed by Monsanto Chemical Co., St. Louis 4, Mo. It contains nonionic type surface active agent and detergent. Use may be alone or in combination with other alkalies in scouring, cleansing, deterging or washing operations.

Check No. 17 on Reply Card for more Details

ALUMINUM LACQUER: Bright, durable and protective finishes are provided by Liqui-Plate baked aluminum mono-lacquer, a development of Multi-Coat Corp., Bedford, O. It may be applied to any clean ferrous surface by spray, dip, flow or roller coating. Paint can be made to fit any special temperature or time cycle, whether baking is by infrared or atmosphere oven.

Check No. 18 on Reply Card for more Details

CIRCUIT TESTER: Series 40 pocket size wide range tester, manufactured by Precision Apparatus Co. Inc., Elmhurst, L. I., N. Y., affords 31 alternating-direct current ranges to 6000 volts, 600 MA, plus 70 DB and 5 megohms. Self-contained instrument has a 3-inch meter. Multiplier and shunt resistors are accurate to 1 per cent.

Check No. 19 on Reply Card for more Details

LIQUID LEVEL CONTROL: Direct or reverse action is possible with the Leveltronic relay for liquid level control, developed by R-S Products Corp., Philadelphia 44, Pa. This provides for fail-safe action on line failure or a tube becoming inoperative, thereby protecting against overflow or underfilling. Out-contacts may be used to sound an alarm, light a signal light or shut down the process.

Check No. 20 on Reply Card for more Details

RAPID MARKER: Sheets and strips of any material may be marked at up to 2000 feet per minute and a complete die change made in 30 seconds with the Master Marker automatic printing machine announced by Pannier Corp. Mounted and positioned on an overhead crossbar, the device is motivated by a friction drive. Die is held by a single spring pin.

Check No. 21 on Reply Card for more Details

PRESSURE SWITCHES: Designed to make or break an electrical switch in accordance with preset pressures, the No 9048 line of pressure switches manufactured by Saval Co., Los Angeles 11, Calif., can be made to operate throughout the full range of 100 to 5000 pounds per square inch. Units compensate for temperature changes. Usable in various systems, the switches operate in oil, fuel, freon, gas or air service.

Check No. 22 on Reply Card for more Details

TERMINAL BLOCK: More connections in a given space and rapid disconnection and positive locking are advantages of the new terminal block announced by Burndy Engineering Co., New York 54, N. Y. Known as Crablok, it is available in several lengths and in single and double tier models. Contact tips are indented into wires. An insulating cover of white plastic covers block and gives identification area.

Check No. 23 on Reply Card for more Details

LIQUID WIRE STRIPPER: Formex, Formavar, enamel and similar wire insulations may be rapidly removed by Formula 21 liquid wire stripper, developed by Aircraft-Marine Products Inc., 1597 North 4th St., Harrisburg, Pa. Wire is dipped in liquid and wiped or blown off. It is noninflammable and noncorrosive.

Check No. 24 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

STEEL SUPPLY— There is nothing in the steel outlook to indicate any significant change in tight supply conditions over the remainder of this year. Demand continues as pressing as at any time since the end of the war, and with voluntary allocations for preferred domestic programs, European requirements, and new defense needs in the offing, there is every likelihood steel production in the last half of the year will fall considerably short of overall requirements.

In event the coal miners abandon the pits in July for any prolonged period there is little question a really serious supply situation may be confronted since the steel producers, with limited coal stocks, will be forced to curtail output much more quickly than was the case in the April mine work stoppage.

PRODUCTION— Whether a mine strike will be averted is anyone's guess. The answer largely rests with John L. Lewis. Meanwhile, steelmakers are keeping their fingers crossed hoping a satisfactory solution to the mine labor problem can be found and that they will be able to maintain steel output at a high rate through the rest of the year.

Despite the April mine work stoppage, which cost over 1,500,000 tons of steel production, output of steel ingots in the first six months of this year is expected to come out around 43 million tons, bettering production in the like period of 1947 by a slight margin. Barring further interruptions, steel production for all of 1948 should total 87 or 88 million tons, 2 to 3 million tons more than in all of 1947.

OPERATIONS—Steelmaking operations were maintained at peacetime record pace last week, the estimated national ingot rate rising 1/2 point to 96 per cent of capacity. This was equivalent to output of about 1,732,000 tons and compared with 1,281,210 tons for the average week in 1940, the highest prewar production year.

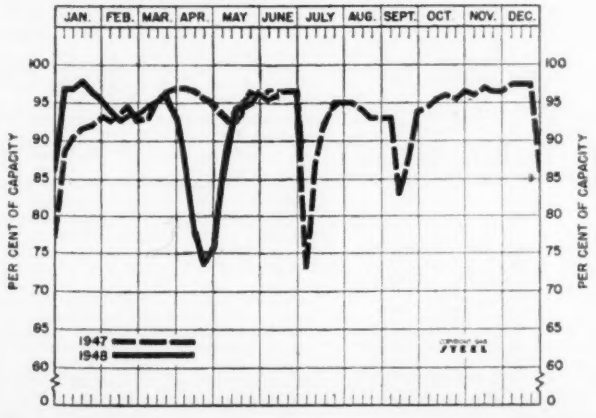
PRICES— Tone of the steel market is strong. While producers who recently effected price reductions are sticking to their new schedules, many other producers still have taken no action and at this writing give no sign of doing so. In fact, with production costs still rising some observers are of the opinion the price line can not be held for long. At the moment the pig iron market is being closely watched for a general price rise, several makers within the past few weeks having effected advances of $3 per ton. Last week silvery and gray forge iron prices were advanced $4 and $3 per ton respectively by three important producers. This upturn in pig iron is seen as possibly forecasting upward adjustments later in finished steel prices.

STEEL's arithmetical price composites held unchanged last week and compared with those for the like 1947 week as follows: Finished steel, $80.27 and $69.82; semifinished steel, $68.62 and $52.10; steelmaking pig iron, $40.12 and $32.49; steelmaking scrap, $40.67 and $31.25.

ALLOCATIONS— Progress in developing voluntary allocations for preferred domestic programs is reported by the Office of Industry Cooperation. However, since these programs are not designed to care for general consuming needs Congress is under steadily rising pressure from small steel buyers to effect mandatory allocations. Last week a Senate committee was advised by representatives of the steel industry that there is no way the individual steel producers can work out a distribution program other than the system now followed, since antitrust laws prohibit concerted action.

Despite rising sentiment in some congressional circles favoring mandatory allocations it is believed such will be effected only as a last resort and only in event supply conditions become much worse than they are at present.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended June 12	Change	Same Week 1947	Same Week 1946
Pittsburgh	95.5	+ 0.5	100.5	69.5
Chicago	95.5	— 0.5	95	79
Eastern Pa.	89	None	93	81
Youngstown	103	None	93	42
Wheeling	97.5	+ 8.5	89	79
Cleveland	95.5	+ 1	91.5	85.5
Buffalo	98.5	+ 5.5	88.5	86
Birmingham	100	None	99	95
New England	78	None	92	80
Cincinnati	96	— 4	85	87
St. Louis	89.5	None	82	54.5
Detroit	100	None	89	86
Estimated national rate	96	+ 0.5	96.5	75

Based on weekly steelmaking capacity of 1,802,476 net tons for 1948; 1,749,928 tons for 1947; 1,762,381 tons for 1946.

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COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	June 12	June 5	Month Ago May 1948	Year Ago June 1947	5 Years Ago June 1943
Finished Steel	$80.27	$80.27	$80.27	$69.82	$56.73
Semifinished Steel	68.62	68.62	68.62	52.10	36.00
Steelmaking Pig Iron	40.12	40.12	39.66	32.49	23.00
Steelmaking Scrap	40.67	40.67	40.67	32.48	19.17

FINISHED STEEL WEIGHTED COMPOSITE†	
May 1948	3.59799c
Apr. 1948	3.63079c
May 1947	3.11584c
May 1943	2.44941c

***STRAIGHT ARITHMETICAL COMPOSITES:** Computed from average industry-wide base prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (re-rolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading basing points), and on Steelworks Scrap (No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composites, dollars per net ton; pig iron and scrap, gross ton.

†FINISHED STEEL WEIGHTED COMPOSITE: Computed in cents per pound, base prices, weighted by actual monthly shipments of following products, representing 82 per cent of total steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. April and May figures are preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton; others dollars per gross ton.

Finished Materials

	June 12, 1948	May 1948	Mar. 1948	June 1947
Steel bars, Pittsburgh	2.875c	2.875c	2.90c	2.60c
Steel bars, del. Philadelphia	3.365	3.365	3.356	2.98
Steel bars, Chicago	2.875	2.875	2.90	2.60
Shapes, Pittsburgh	2.775	2.775	2.80	2.50
Shapes, del. Philadelphia	2.98	2.98	2.968	2.64
Shapes, Chicago	2.775	2.775	2.80	2.50
Plates, Pittsburgh	2.925	2.925	2.95	2.65
Plates, del. Philadelphia	3.21	3.21	3.19	2.85
Plates, Chicago	2.925	2.925	2.95	2.65
Sheets, hot-rolled, Pittsburgh	2.775	2.775	2.80	2.50
Sheets, cold-rolled, Pittsburgh	3.50	3.50	3.55	3.20
Sheets, No. 10 galv., Pittsburgh	3.90	3.90	3.95	3.55
Sheets, hot-rolled, Gary	2.775	2.775	2.80	2.50
Sheets, cold-rolled, Gary	3.50	3.50	3.55	3.20
Sheets, No. 10 galv., Gary	3.90	3.90	3.95	3.55
Strip, hot-rolled, Pittsburgh	3.05	3.05	3.05	2.50
Strip, cold-rolled, Pittsburgh	3.775	3.775	3.80	3.20
Bright basic, bess. wire, Pittsburgh	3.725	3.725	3.775	3.425
Wire nails, Pittsburgh	5.125	5.125	5.20	4.125
Tin plate, per base box, Pittsburgh	$6.60	$6.60	$6.70	$5.75

Semifinished

Sheet bars, Pittsburgh, Chicago	$60.00	$60.00	$60.00	$44.64
Slabs, Pittsburgh, Chicago	45.00	45.00	45.00	37.50
Rerolling billets, Pittsburgh	45.00	45.00	45.00	37.50
Wire rod 5/32 to ¼-inch, Pitts.	3.175c	3.175c	3.175c	2.55c

Pig Iron

	June 12, 1948	May 1948	Mar. 1948	June 1947
Bessemer, del. Pittsburgh (N.&S. sides)	$44.08	$41.038	$40.996	$34.83
Basic, Valley	39.00	39.00	39.00	33.00
Basic, eastern del. Philadelphia	42.17	42.17	42.004	35.52
No. 2 fdry., del. Pgh. (N.&S. sides)	43.58	40.538	40.496	34.33
No. 2 fdry., del. Philadelphia	42.67	42.67	42.504	36.02
No. 2 foundry, Chicago	39.00	39.00	39.00	33.00
No. 2 foundry, Valley	39.50	39.50	39.50	33.50
Southern No. 2, Birmingham	39.38	38.63	37.88	29.88
Southern No. 2, del. Cincinnati	45.09	43.90	41.857	34.75
Malleable, Valley	39.50	39.50	39.50	33.50
Malleable, Chicago	39.50	39.50	39.50	33.50
Charcoal, low phos., fob Lyles, Tenn.	58.00	56.50	55.00	40.50
Ferromanganese, fob cars, Pittsburgh	151.00	151.00	151.00	140.25

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$40.25	$40.25	$40.25	$32.44
Heavy melt. steel, No. 2, E. Pa.	39.00	39.00	39.00	33.38
Heavy melt. steel, No. 1 Chicago	39.25	39.25	38.875	30.75
Heavy melt. steel, No. 1, Valley	40.25	40.25	40.25	34.06
Heavy melt. steel, No. 1, Cleveland	39.75	39.75	39.75	32.38
Heavy melt. steel, No. 1, Buffalo	43.00	43.00	44.00	32.00
Rails for rerolling, Chicago	52.50	51.75	49.625	38.75
No. 1 cast, Chicago	69.00	66.00	66.00	39.50

Coke

Connellsville, beehive furnace	$13.00	$12.94	$12.50	$9.56
Connellsville, beehive foundry	15.125	15.06	14.875	10.75
Chicago, oven foundry, del.	20.75	20.75	19.25	16.10

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $90-$95 per gross ton. Forging quality $46 per net ton, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56 per gross ton.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Buffalo, Birmingham, $45 per net ton; Cleveland, $47 per net ton; sales by smaller interests on negotiated basis at $85 per gross ton, or higher.

Forging Quality Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $54 per net ton.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66 per gross ton.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Youngstown, $60 nom., per net ton; sales in open market $95-$105 per gross ton.

Skelp: Pittsburgh, 2.85-2.90c; Youngstown, 2.90c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69-70 per net ton; some sellers quoting up to $120 per gross ton.

Wire Rods: Pittsburgh, Chicago, Birmingham, 5/32 to ¼-in., inclusive, $2.80-3.55 per 100 lb. 5/32 to 47/64-in., inclusive, $2.75, Cleveland; Galveston, $2.95; Worcester, $2.90-2.95. San Francisco (base del.), $3.5245.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in. (Base 20 tons one size): Pittsburgh, Youngstown, Chicago, Gary, Birmingham, 2.85-2.90c; Cleveland, Buffalo, 2.90c; Detroit, del., 3.11c; eastern Mich., 3.18c New York, del., 3.43c; Phila., del., 3.34-3.39c; San Francisco (base, del.), 3.5845-3.95c; Los Angeles (base, del.), 3.579-3.86c; Seattle, 3.8375-3.85c, base.

Rail Steel Bars: Same basing points as merchant carbon bars. Prices upon application.

Hot-Rolled Alloy Bars (Base 20 tons one size): Pittsburgh, Youngstown, Chicago, Gary, 3.20-3.30c; Canton, Massillon, Buffalo, Bethlehem, 3.30c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars (Base 40,000 lb): Pittsburgh, Chicago, Gary, Cleveland, Buffalo, 3.45-3.55c; Detroit, del. 3.61c; Toledo, 3.68c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Cleveland 4.00-4.10c; Gary, Buffalo, Canton, base 4.10c.

Reinforcing Bars (New Billet): Pittsburgh, 2.70-2.75c; Chicago, Gary, Youngstown, Birmingham, 2.70; Sparrows Point, Buffalo, base 2.75c; San Francisco (base, del.), 3.3345c; Los Angeles (base, del.), 3.329c; Seattle, 3.88c-4.18c base.

Iron Bars: Single refined: Pittsburgh 7.70c (hand puddled), Economy, Pa., 8.65c. Double refined: Pittsburgh 9.75c (hand puddled), Economy, Pa., 10.00c. Staybolt: Pittsburgh 11.25c (hand puddled), Economy, Pa., 10.20c.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Birmingham, Youngstown, 2.75-2.80c; Cleveland, Buffalo, Sparrows Point, Ashland, Ky., base, 2.80c; Detroit, del., 3.01c; eastern Mich., del., 3.08c; Philadelphia, del., 3.06c; New York, del., 3.18c; Los Angeles (base, del.), 3.494-3.544c; San Francisco, (base, del.) 3.4995-3.5495c. (Alan Wood Steel Co., Conshohocken, Pa., quotes 4.20c, Sparrows Point equivalent).

Cold-Rolled Sheets: Pittsburgh, Chicago, Gary, 3.45-3.55c; Cleveland, 3.50-3.55c; Middletown, 3.50c; Buffalo, Youngstown, Sparrows Point, 3.55c; Granite City, 3.65c; Detroit, del., 3.66-3.76c; eastern Mich., del., 3.73-3.83c; New York, del., 3.93c; Philadelphia, del., 3.81c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Gary, Birmingham, 3.85-3.95c; Chicago, Sparrows Point, Canton, Middletown, 3.95c; Kokomo, 4.55c; Youngstown, 3.95-4.45c; Granite City, 4.35c; New York, del., 4.33c; Philadelphia, del., 4.21c; Los Angeles (base, del.), 4.624c; San Francisco (base, del.), 4.6295c.

Corrugated Galvanized Sheets, No. 10 (Based on 5-cent zinc): Pittsburgh, Chicago, 3.95-4.05c; Gary, Birmingham, Canton, Youngstown, Middletown, 3.95c.

Culvert Sheets, No. 16 flat (based on 5-cent zinc; corrugated 10 cents extra): Copper alloy: 4.45-4.55c, Pittsburgh, Gary, Birmingham; 4.55c Chicago; 4.90c, Kokomo; 5.00c, Granite City; 5.344c (base del.), Los Angeles; 5.3495c (base del.), San Francisco.
Copper-iron or pure iron: 4.80-4.90c, Pittsburgh; 4.80c, Gary; 4.90c, Chicago, Canton; 5.35c, Granite City.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 4.05c.

Enameling Sheets, No. 12: Pittsburgh, 3.85-3.95c; Chicago, Gary, 3.75-3.95c; Cleveland, Middletown, 3.85c; Youngstown 3.95c-4.45c; Granite City, 4.05c; Detroit, del., 4.16c; eastern Mich., 4.23c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.40-4.50c; Kokomo, Ind., 4.60c. Armature: Pittsburgh, 4.70-5.30c; Chicago, Gary, 4.70-4.80c; Granite City, Ill., 5.25c; Kokomo, Ind., 4.90c. Electrical: Pittsburgh, 5.20-5.80c; Chicago, Gary, 5.20-5.30c; Granite City, Ill., 5.75c; Kokomo, Ind., 5.40c Motor: Pittsburgh, 5.95-6.80c; Chicago, Gary, 5.95-6.05c; Granite City, 6.50c. Dynamo: Pittsburgh, 6.65-7.00c; Granite City, 7.20c. Transformer 72, 7.15-8.25c; 65, 7.85-9.20c; 58, 8.55-9.90c; 52, 9.35-9.45c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, 2.80c-3.30c; Chicago, Gary, Birmingham, Youngstown, Cleveland, 2.75-2.80c; Detroit, del., 3.01c; eastern Mich., del., 3.08c; San Francisco (base, del.), 3.5595c; Los Angeles (base, del.), 3.554c.

Cold-Rolled Strip: 0.25 carbon and less: Pittsburgh, 3.50-4.05c; Cleveland, 3.45-3.85c; Youngstown, 3.55-3.85c; Chicago, Gary, 3.55-3.65c; Detroit, del. 3.66-3.76c; eastern Mich., 3.73-3.83c; Worcester, base, 3.65c.

Cold-Finished Spring Steel: Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 4.95-5.05c; over 0.60 to 0.80, 5.55-5.65c; over 0.80 to 1.05, 7.05-7.15c; over 1.05 to 1.35, 9.35-9.45c; add 0.20c for Worcester.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, per base box of 100 lb, 1.25 lb coating $6.50, 1.50 lb coating $6.70; Sparrows Point, Birmingham and Warren, O., $6.60 and $6.80, respectively; Granite City, $6.70 and $6.90, respectively.

Electrolytic Tin Plate: Pittsburgh, Gary, per base box of 100 lb, 0.25 lb tin, $5.70; 0.50 lb tin, $5.90; 0.75 lb tin $6.10; Sparrows Point, Birmingham and Warren, O., $5.80, $6.00, $6.20, respectively; Granite City, $5.90, $6.10, $6.30, respectively.

Can Making Black Plate: Pittsburgh, Gary, per base box of 100 lb, 55 to 70 lb basis weight, $5.10; 75 to 95 lb basis weight, $5.00; 100 to 128 lb basis weight, $5.10. Birmingham and Warren, O., $5.20, $5.10, $5.20, respectively.

Hollowware Enameling Black Plate: Pittsburgh, Chicago, Gary, base 29-gage, 4.65c per lb; Sparrows Point, Warren, O., 4.75c; Granite City, 4.85c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, per base box of 100 lb. $5.80; Granite City, Birmingham, Sparrows Point, $5.90; Granite City, $6.

Roofing Ternes: Pittsburgh, per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $15.30.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, 2.90-2.95c; Cleveland, Sparrows Point, 2.95c; Coatesville, 3.45c; Claymont, 3.65c; Geneva, Utah, 2.90c; Det., del., 3.21c; New York, del., 3.33c; Phila., del., 3.21c; Boston, del., 3.51c; St. Louis, del., 3.269c; San Francisco and Los Angeles, del., 3.493c for sizes and grades produced at Geneva; 3.76c for sizes and grades produced at Fontana, Calif.
(Central Iron & Steel Co., Harrisburg, Pa., 5.10c, basing points.)

Floor Plates: Pittsburgh, 4.05c; Chicago, 3.95-4.05c; Gary, 3.95c; Cleveland, 4.20c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Gary, 3.70c; Coatesville, 4.80c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 24.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, 2.75-2.80c; Buffalo, Bethlehem, 2.80c; New York, del., 3.06c; Phila., del., 2.98c; Geneva, Utah, 2.75c; Los Angeles (base, del.), 3.424-3.474c for sizes produced at Torrance, Calif.; Los Angeles and San Francisco, del., 3.343c for sizes produced at Geneva, 3.81c for sizes produced by Bethlehem in East; San Francisco, del., 3.54c for sizes produced at Fontana, Calif.

Beams, Wide Flange: Pittsburgh, Chicago, 2.70c.

Alloy Structural Shapes: Pittsburgh, Chicago, Gary, 3.45-3.55c.

Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds.)

Wire to Manufacturers in carloads

Bright, basic or bessemer..... *$3.45–4.00
Basic MB Spring (except Birm.)..**$4.85–4.95
Upholstery Spring (except Birm.) †$4.50–4.60

Wire Products to Trade in carloads

Wire, Merchant Quality
Annealed (6 to 8 base).....††$4.10–4.20
Galvanized (6 to 8 base).....††$4.55–4.65
(Fob Pittsburgh, Chicago, Duluth, Birmingham, per base column).

Nails
Standard, cement-coated, galvanized.. ‡91–94
Staples, polished and galvanized..... ‡‡91–94
Woven fence, 15½ gage and heavier. §97–100
Barbed wire, 80-rod spool .....§§111–113
Fence Posts (with clamps)..... ★107
Bale ties, single loop .....★★94-100

* Worcester, $3.55; Duluth, $3.50; San Francisco (base, del.) $4.4645 bright basic only.

** Worcester, $4.95; Duluth & Trenton, N.J., $5.10 (bright only); San Francisco (base del.) $5.8845.

† Worcester $4.60; Duluth and Trenton, N. J., $4.75; San Francisco (base, del.), $5.5345 black upholstery.

†† One producer quotes 25 cents higher at Birmingham and Chicago; Worcester $4.20 annealed, $4.65 galvanized; Cleveland, annealed $4.10, galvanized $4.55; Duluth $4.10 annealed, $4.55 galvanized; Kokomo, Ind., $4.80 annealed, $5.25 galvanized; San Francisco (base, del.) $5.1145 annealed, $5.5645 galvanized.

‡ Cols. 108 and 114 also quoted Pittsburgh; Worcester, Cleveland 97; Duluth, 91; San Francisco (base, del.) 112.

‡‡ Cols. 108 and 114 also quoted Pittsburgh; Worcester 97; San Francisco (base del.) 112.

§ Col. 101 also quoted at Pittsburgh; San Francisco (base del.) 120.

§§ San Francisco (base del.) 131.

★ Duluth, 104.

★★ San Francisco (base del.) 118; Chicago, Birmingham, 94-99.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.70-$2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.05 per 100 lb; light rails (rail-steel), prices upon application.
Relaying, 60 lb and over fob warehouse $60-$65 per net ton.

Supplies: Track bolts, 7.00c; heat treated, 7.25c. Tie plates $3.55-$3.65 per 100 lb, fob mill; $3.40 base. Seattle; $3.70 fob Pittsburg, Calif. Splice bars $3.75-$3.85 per 100 lb fob mill. Standard spikes, 4.85c; screw spikes, 6.75c. Axles 4.45-4.50c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 to 2 points less on steel butt weld on sizes produced in that district.

	Butt Weld			Butt Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	44½	17	1	52½–53½	36½–37½
¼	44½	21½	1¼ ...	53–54	37–38
⅜	41	17	1½ ...	53½–54½	37½–38½
½	47–48	29½–30½	2	54–55	38–39
¾	50–51	33½–34½	2½, 3..	54½–55½	38½–39½

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	44½	28	44	27½	43½	27
2½ & 3	48½	32	47	30½	46½	30
3½-6 ..	50½	34	49	32½	48½	32

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Butt Weld	In.	Butt Weld
⅛	43½	1	51½-52½
¼	43½	1¼	52-53
⅜	40	1½	52½-53½
½	46–47	2	53-54
¾	49–50	2½ & 3...	53½-54½

In.	Lap Weld	Elec. Weld	Seamless
2	43½	43	42½
2½ & 3.....	46½	46	45½
3½-6	48½	48	47½
8	50½	50	49½
10	50	49½	49
12	49	48½	48

Standard Wrought Iron Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh.

	Butt Weld			Lap Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅜ ...+46½		+74½	1¼ ..+12		+34½
½ ...+11		+35	1½ ..+ 6		+27½
¾ ...+ 1½		+25	2 ....— 1½		+20
1 and 1¼ .— 4		+16½	2½-3½— 4		+16
1½ ..— 9½		+13	4 ....— 8		+10½
2 ....—10		+12½	4½-8 .— 6		+12
			9-12 ..+ 3		+21½

Boiler Tubes: Net base prices per 100 ft. fob Pittsburgh, in carload lots, minimum wall thickness, cut lengths 4 to 24 feet, inclusive.

		——Seamless——		—Elec. Weld—	
O.D.		Hot	Cold	Hot	Cold
Sizes	B.W.G.	Rolled	Drawn	Rolled	Drawn
1"....	13	....	$12.21	$11.51	$11.51
1¼"..	13	....	14.46	11.48	13.64
1½"..	13	$13.72	16.14	12.69	15.22
1¾"..	13	15.60	18.37	14.43	17.31
2"....	13	17.48	20.57	16.17	19.39
2¼"..	13	19.48	22.93	18.02	21.62
2½"..	12	21.46	25.25	19.86	23.80
2½"..	12	23.51	27.65	21.75	26.06
2¾"..	12	24.91	29.30	23.05	27.63
3"....	12	26.15	30.77	24.18	29.00
3¼"..	11	30.44	35.82	28.16	33.77
3½"..	11	32.68	38.47	30.23	36.27
4"....	10	40.57	47.73	37.53	44.99
4½"..	9	53.77	63.29	....	....
5"....	9	62.25	73.25	....	....
6"....	7	95.56	112.44	....	....

Pipe Cast Iron: Class B, 6-in. and over $79.50 per net ton, Birmingham; $84.50, Burlington, N. J.; $91.12, del. Chicago; 4-in. pipe, $5 higher; class A pipe, $5 a ton over Class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 19c per cwt in carlots, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step, plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	45 off
⅝ and ⅝ x 6-in. and shorter.....	46 off
¾-in. and larger x 6-in. and shorter.	43 off
All diameters longer than 6-in.....	41 off
Tire bolts	35 off
Step bolts	43 off
Plows bolts	54 off
Lag bolts	
All diameters 6 in. and shorter....	46 off
All diameters longer than 6 in.	44 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in. and smaller.....	46 off	.....
½-in. and smaller.....	.....	44 off
½-in.-1-in.	44 off	.....
⅝-in.-1-in.	.....	43 off
1⅛-in.-1½-in.	42 off	41 off
1⅝-in. and larger	.....	35 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright).....	53 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter....	48 off
¾, ⅞, & 1 x 6 and shorter.....	44 off

Square Head Set Screws

Upset 1-in. and smaller.....	57 off
Headless, ¼-in. and larger.....	40 off
No. 10 and smaller	52 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural ½-in. and larger.....	5.65c
Lebanon, Pa.	.....5.65c plus 19c per cwt in cl., 26c lcl.
⅞-in. and under	55 off
Lebanon, Pa.	.....55 off plus 19c per cwt in cl., 26c lcl.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $1-$2 off

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base Per lb
18.00	4	1	...	82.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	67.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	▪4	4.50	80.00c

Stainless Steels

Base, cents per lb, Pittsburgh, Chicago, Cleveland, Bethlehem, Canton, Massillon, Middletown, Watervilet, Dunkirk, Syracuse, Reading, Ft. Wayne, Titusville, Brackenridge, Jersey City, W. Leechburg, Baltimore and Washington, Pa.

Grade	Bars, Wire, Shapes	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
	CHROMIUM NICKEL STEELS				
301....	26.00c	29.50c	37.00c	22.00c	28.00c
302....	26.00	29.50	37.00	23.50	30.50
303....	28.50	31.50	39.00	29.50	36.00
304....	27.50	31.50	39.00	25.50	32.50
308....	31.50	37.00	44.50	31.00	38.00
309....	39.00	43.50*	51.00*	40.50	51.00
310....	53.50	56.50†	57.50‡	53.00	61.00
316....	43.50	48.00	52.00	43.50	52.00
321....	31.50	37.00	44.50	32.00	41.50
347....	36.00	41.50	49.00	36.00	45.50
	STRAIGHT CHROMIUM STEEL				
410....	20.50	23.50	29.00	18.50	24.00
416....	21.00	24.00	29.50	20.00	25.50
420....	26.00	31.00	36.50	26.00	39.50
430....	21.00	24.00	31.50	19.00	24.50
430F ..	21.50	24.50	32.00	20.50	27.00
442, 443	24.50	28.00	35.50	26.00	35.00
446....	30.00	33.00	39.50	38.00	56.50
§501...	9.00	13.00	17.50	13.00	18.50
§502...	10.00	14.50	18.50	14.50	19.50
	STAINLESS CLAD STEEL (20%)				
304....	....	24.00	22.00	....	....
410....	....	22.00	20.00	....	....
430....	....	22.50	20.50	....	....
446....	....	29.00	27.00	....	....

One producer quotes: * 6.50c higher, † 3.50c higher, ‡ 10.00c higher. § Low chromium. ** Fob Pittsburgh, Washington and Coatesville, Pa.; plate prices include annealing, pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., base	$40.00	$40.50	$41.00	$41.50
Newark, N. J., del.	42.39	42.89	43.39	43.89
Brooklyn, N. Y., del.	....	44.40	44.90	....
Philadelphia, del.	42.17	42.67	43.17	43.67
Birmingham, base	38.88	39.38	....	....
Cincinnati, del.	....	45.09	....	....
Buffalo, base	40.00†	40.00†	40.50†	41.00
Boston, del.	48.42	48.42	48.92	....
Rochester, del.	42.22	42.22	42.72	43.22
Syracuse, del.	43.025	43.025	43.525	44.025
Chicago, base	38.50	39.00	39.50	40.00
Milwaukee, del.	40.22	40.72	41.22	41.72
Muskegon, Mich., del.	....	43.98	44.48	....
Cleveland, fob furnace	38.50†	39.00†	39.50†	40.00
Akron, del.	40.67	41.17	41.67	42.17
Duluth, base	39.00	39.50	40.00	40.50
Erie, Pa., base	38.50	39.00	39.50	40.00
Everett, Mass., base	....	45.00	45.50	....
Granite City, Ill., base	45.25	45.75	46.25	....
St. Louis, del.	46.00	46.50	47.00	....
‡**Neville Island, Pa.,** base	42.00	42.50	42.50	43.00
Pittsburgh, del., N.&S. Sides	43.08	43.58	43.58	44.08
Provo, Utah, base	39.00	39.50	....	....
Seattle, Tacoma, Wash., del.	....	46.63	....	....
Portland, Oreg., del.	....	46.63	....	....
Los Angeles, San Francisco	46.13	46.63	....	....
Sharpsville, Pa., base	39.00	39.50	39.50	40.00
Steelton, Pa., base	40.00	40.50	41.00	41.50
Struthers, O., base	42.50	....	....	....
Swedeland, Pa., base	45.00	45.50	46.00	46.50
Toledo, O., base	38.50	39.00	39.50	40.00
Cincinnati, del.	43.05	43.55	....	....
Youngstown, O., base	39.00	39.50	39.50	40.00
Mansfield, O.	42.87	43.37	43.37	43.87

† Republic Steel Corp. quotes $2.875 higher for No. 2 foundry and malleable and $2.375 higher for basic at Buffalo, and $1.25 higher at Cleveland, effective on shipments during week ended June 13.

‡ To Neville Island base add: $0.86 for McKees Rocks, Pa.; $1.31 Lawrenceville, Homestead, McKeesport, Monaco; $1.73 Verona; $1.94 Brackenridge; $1.08 to Ambridge and Aliquippa.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base) .$53.50
6.51-7.00 . . $54.75
7.01-7.50 . . 56.00
7.51-8.00 . . 57.25
8.01-8.50 . . 58.50
8.51-9.00 . . 59.75
9.01- 9.50 . 61.00
9.51-10.00 . 62.25
10.01-10.50 . 63.50
10.51-11.00 . 64.75
11.01-11.50 . 66.00
Fob Jackson, O., per gross ton.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton. **Electric Furnace Silvery Pig Iron** Si 14.01-14.50%, $77.50, Jackson, O.; $78.75, Niagara Falls; $78 open-hearth and $79 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.05% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn. . . . . $58 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $42.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $46.00. Philadelphia, $48.81, delivered. Intermediate phosphorus, Central furnace, Cleveland, $42.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace . . $12.00-$14.00
Connellsville, foundry . . 14.00- 16.25
New River, foundry . . . 15.50
Wise county, foundry . . 14.25
Wise county, furnace . . 13.50

Oven Foundry Coke

Kearney, N. J., ovens . . $20.50
Chicago, outside del. . . 19.50
Chicago, del. 20.75
Terre Haute, ovens 20.25
Milwaukee, ovens 20.25
New England, del. 21.75
Birmingham, del. 16.71
Indianapolis, ovens . . . 19.50
Cincinnati, del. 20.50
Ironton, O., ovens 18.25
Erie, Pa., del. 21.55
Painesville, O., ovens . . 20.00
Cleveland, del. 21.55
Buffalo, del. 21.75-22.20
Detroit, del. 20.75
Philadelphia, ovens . . . 19.55
Swedeland, Pa., ovens . . 19.50
Portsmouth, O., ovens . . 18.25

Coal Chemicals

Spot, cents per gallon

Pure and 90% benzol . . . . . 21.00†
Toluol, two degrees 28.00
Industrial xylol 28.00
Solvent naphtha 28.00

Per pound fob works

Phenol (car lots, returnable drums) 13.00
Do., less than carlots 13.75
Do., tank cars 12.00

Eastern plants, per pound

Naphthalene flakes, balls, bbl. to jobbers, "household use" 12.00

Per ton, bulk, fob plants

Sulphate of ammonia $40.00

† Freight allowed up to 2 cents.

Refractories

Net Prices

Per 1000, fob shipping point

Fire Clay Brick

Super Duty

Pa., Mo., Ky. $92.00

High Heat Duty

Pa., Mo., Ky. 73.00
Ala., Ga. 73.00
N. J. 78.00

Intermediate Heat Duty

Ohio 67.00
Pa., Mo., Ky. 67.00
Ala., Ga. 59.00
N. J. 70.00

Low-Heat Duty

Pa., Md., Ohio 59.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press 50.00
Wire Cut 48.00

Malleable Bung Brick

All bases 83.00

Silica Brick

Pennsylvania 73.00
Joliet, E. Chicago 82.00
Birmingham, Ala. 73.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick 64.00
Chem. bonded chrome 64.00
Magnesite brick 86.00
Chem. bonded magnesite 75.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk 27.00
Single bags 31.50

Dolomite

Domestic, dead-burned, bulk, net tons, fob Billmeyer, Blue Bell or Williams, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg or Woodville, O., $11.85; Midwest (fob Thornton or McCook, Ill.), add $0.10; Missouri Valley (fob Dolly Siding, and Bonne Terre Mo.), add $0.20.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural) Lower Lake Ports

(Any increase or decrease in R. R. freight rates, dock handling charges and taxes thereon effective after Apr. 1, 1948, are for buyer's account.)

Old range bessemer $6.60
Old range nonbessemer 6.45
Mesabi bessemer 6.35
Mesabi nonbessemer 6.20
High phosphorus 6.20

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract 15.25

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos. . . . Nom.
Swedish basic, 60 to 68% . 13.50-14.00
Spanish, No. African basic, 50 to 60% . . . . . Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom. 5.50-6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid . . . . . $26-$28

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 67.60c-72.60c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African
48% 2.8:1 . . . . . $37.50
48% 3:1 . . . . . 39.00
48% no ratio 31.00

South African (Transvaal)
44% no ratio . . . . . $25.50-$26.00
45% no ratio 26.50
48% no ratio 29.00-30.00
50% no ratio 29.50-30.50

Brazilian—nominal
44% to 2.5:1 lump $33.65

Rhodesian
45% no ratio . . . . . $27-$27.50
48% no ratio 30.00
48% 3:1 lump 39.00

Domestic (seller's nearest rail)
48% 3:1 . . . . . $39.00

Molybdenum

Sulphide conc., lb., Mo., cont., Mines $0.75

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $35; less than 60% $32.

HIGH STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Cleveland	Bethlehem	Canton Massillon
Sheet, Hot-Rolled	4.20	4.20–4.30	4.20–4.30	4.20–4.30	4.30	4.30	4.20	...	...
Cold-Rolled	5.20	5.20–5.30	5.20–5.30	5.20–5.30	...	5.30	5.20	...	...
Galvanized	5.90	.....	.....	.....	...	6.00	...	...	...
Strip, Hot-Rolled	4.20	4.30	4.20–4.30	4.20–4.30	...	...	4.20	...	...
Cold-Rolled	5.20	5.30†	5.30†	5.30	...	...	5.20	...	...
Shapes, Structural	4.20	4.20–4.30	4.20	4.30	...	...	...	4.30	...
Plates	4.45	4.45–4.55	4.45–4.55	.....	4.55	...	...	...	...
Bars, Small Shapes	4.35	4.35–4.45	4.35–4.45	4.35–4.45	...	4.45	...	...	4.45

† Nax High Tensile, produced by Great Lakes Steel Corp., quoted 10 cents higher.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS			STRIP		BARS				PLATES	
	H-R 10 Ga.	C-R 17 Ga.	Gal. *10 Ga.	†H-R	†C-R	H-R Rds. ⅜" to 3"	C-F Rds. ½" & up	H-R Alloy **4140	Structural Shapes§§	Carbon ⅜"-¾"	Floor ⅜" & Thicker
Boston (city)	5.08	5.84[4]	6.28[4]	5.64	6.90	5.09	5.96	7.70	4.94	5.23	6.89
Boston (c'try)	4.98	5.64[4]	6.08[4]	5.44	...	4.89	...	...	4.74	5.03	6.69
New York (city)	4.94	5.80	6.13	5.58	...	5.05	5.78	7.23	4.77	5.09	6.58
New York (c'try)	4.79	5.65	5.98	5.43	...	4.90	...	...	4.62	4.94	6.43
Phila. (city)	4.67	5.81	5.90	5.16	5.72	4.87	5.75	8.65	4.57	4.85	6.36
Phila. (c'try.)	4.52	5.66	5.75	4.81	5.57	4.73	...	...	4.47	4.71	6.21
Wash. (city)	4.81	...	...	5.08	...	5.14	5.79	...	4.98	5.03	6.68
Wash. (c'try.)	4.71	...	...	4.98	...	5.04	...	...	4.88	4.93	6.58
Balt. (city)	4.27†	5.59	5.62	4.79	...	4.84	5.66	...	4.69	4.72	6.09
Balt. (c'try.)	4.12†	5.44	5.40	4.64	...	4.69	...	...	4.54	4.57	5.94
Norfolk, Va.	4.90	...	...	...	...	5.20	6.00	...	5.15	5.15	6.90
Memphis (city)	4.91[20]§	5.98[8]†	...	5.11[20]	...	5.01[20]	5.88	...	5.01[20]	5.21[20]	6.83[20]
Memphis (c'try)	4.81[20]§	5.88[8]†	...	5.01[20]	...	4.91[20]	5.78	...	4.91[20]	5.11[20]	6.73[20]
Buffalo (city)	4.25	5.20[5]	6.05	5.25	5.97	4.40	5.10	6.85	4.40	5.00	6.25
Buffalo (c'try.)	4.10	5.05[5]	5.50	4.70	5.82	4.25	4.95	6.85	4.25	4.45	5.75
Pitts. (city)	4.20-4.25§	5.05-5.10[8]†	5.60-5.65	4.30-4.35	5.35	4.35-4.40	5.05-5.10	6.85	4.35-4.40	4.55	5.80-5.90
Pitts. (c'try)	4.05-4.10§	4.85-4.95[8]†	5.40-5.50	4.15-4.20	5.20	4.20-4.25	4.85-4.95	6.85	4.20-4.25	4.40	5.65-5.75
Cleve. (city)	4.40-4.90	5.10-5.75[8]	5.74-6.45	4.52	5.25	4.35-4.40	5.00-5.10	7.14	4.67	4.55-4.60	5.80-5.90
Cleve. (c'try.)	4.25-4.90	4.95-5.75[8]	...	...	5.10	4.20-4.25	4.85-4.95	...	...	4.40-4.45	5.65-5.75
Indianapolis	4.52	5.01[8]	5.96	4.62	5.87	4.67‡‡	5.52	8.85	4.67	4.87	6.17
Chicago (city)	4.40	5.10[8]	5.55-5.65	4.30	5.35	4.35	5.00	6.70[9]	4.35	4.55	5.80
Chicago (c'try.)	4.25	4.95[8]	5.40-5.50	4.15	5.20	4.20	4.85	6.70[9]	4.20	4.40	5.65
Milwaukee	4.62	5.32[8]	5.77-5.87	4.52-5.02	5.57	4.57	5.334	7.184[9]	4.57	4.77	6.02
St. Paul, Minn.	4.66[6]	5.56[8]†	6.01[8]	4.76	6.29[12]	4.81[6]	5.94[11]	7.84[11]	4.81[6]	5.01[6]	6.26[6]
St. Louis	4.79	5.49[8]	6.27	5.24	5.97	4.74	5.62[12]	8.97	4.74	4.94	6.19
Cincinnati	4.51-4.66	5.22	5.77	4.80	6.00	4.76	5.59	...	4.80	4.96	6.21
Birming. (c'try.)	4.45[20]§	...	5.65	4.45[20]	...	4.40[20]	6.09[22]	...	4.40	4.65	6.99
Birming. (city)	4.30[20]§	...	5.50	4.30[20]	...	4.25[20]	...	...	4.25	4.50	...
Houston, Tex.	5.75	...	7.36	6.00	...	5.70	7.00	9.25[9]	5.70	5.90	7.20
Omaha, Nebr.	5.31	...	6.76	5.41	...	5.46	6.96	...	5.41	5.66	5.65
Seattle, Wash.	5.45[17]§	7.25[8]‡	7.10	6.15[17]	...	5.65[17]	7.35[1]	8.70[12]	5.30[17]	5.60[17]	7.65[17]
Tacoma, Wash.	5.45[17]§	7.25[8]‡	7.10	6.15[17]	...	5.65[17]	7.35[1]	8.70[12]	5.30[17]	5.60[17]	7.65[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 39,999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—400 to 14,999 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [15]—2000 lb and over; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § 18 gage and heavier; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ add 15c per 100 lb for slow moving items; §§ except wide flange beams, which are 0.05c lower.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $52, Palmerton, Pa., $51, Pittsburgh, 16% to 19% Mn., $51 Palmerton, $50, Pittsburgh.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $145 per gross ton of alloy, carload packed $157, ton lot $172, less ton $189; fob New Orleans, Mobile, Philadelphia, Baltimore, or New York. Carload, lump, bulk $151, fob cars Pittsburgh, including 50c switching charge. Add, or subtract, $1.80 for each 1%, or fraction thereof, of contained manganese over 82% or under 78%.

West Coast Prices: Carload (80,000 lb or more), lump, bulk, same price and basing points as above. All other prices for shipment from Pacific Coast warehouses, add $26.21 to above prices. Delivery is fob Portland, Los Angeles, South San Francisco, or Seattle warehouses, with railroad freight allowed on shipments of 25 gross tons or more.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Eastern Zone, carload, lump, bulk, max. 0.10% C, 22.5c per lb of contained Mn, carload packed 23.25c, ton lot 24.35c, less ton 25.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Eastern Zone, carload, lump, bulk 16.5c per lb of contained Mn, carload packed 17.25c, ton lot 18.35c, less ton 19.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Eastern Zone, carload, 2" x D, bulk 32c per lb of metal, carload packed 32.5c, ton lot 34c, less ton 36c; Central, add 1c for c.l. and 1.45c for l.c.l.; Western, add 1.45c for c.l. and 2.4c for l.c.l. Freight allowed. Spot, add 2c.

Silicomanganese: (Mn 65-70%). Eastern Zone, contract, lump, bulk, 1.50% C grade, 17-20% Si, 7.8c per lb of alloy, carload packed, 8.55c, ton lot 9.45c, less ton 10.45; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. For 2.0% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Eastern Zone, contract, c.l., lump, bulk 18.6c per lb of contained Cr, c.l., packed 19.5c, ton lot 20.65c, less ton 22.05c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Eastern Zone, contract, c.l., SMxD, bulk 20.1c per lb of contained Cr, c.l., packed 21.0c, ton lot 22.35c, less ton 24.1c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Eastern Zone, contract, carload, lump, bulk, max. 0.03% C 28.5c per lb of contained Cr, 0.04% C 27.5c, 0.05% C 27.0c, 0.06% C 26.5c, 0.10% C 26.0c, 0.15% C 25.5c, 0.20% C 25.25c, 0.50% C 25.0c, 1% C 24.5c, 2% C 24.25c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, add C 1.25% max.). Eastern Zone, contract, carload, lump, bulk 25c per lb of contained chromium, carload, packed 26.1c, ton lot 27.3c, less ton 29.1c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 2c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 2c for each 0.25% of N above 0.75%.

Chromium Metal: (Mn. 97% Cr and 1% Fe). Eastern Zone, contract, carload, 1" x D, packed, max. 0.50% C grade, 93c per lb of contained chromium, ton lot 94.5c, less ton 97c; Central, add 1.5c for c.l. and 2.5c for l.c.l.; Western, add 2.75c for c.l. and 4.5c for l.c.l. Freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 9.3c per lb of contained Si, carload packed 10.9c, ton lot 12.35c, less ton 14.0c; Central, add 0.5c for c.l. and 1.25c for l.c.l.; Western, add 0.7c for c.l. and 1.8c for l.c.l. Freight allowed. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (All 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 11.8c per lb of contained Si carload packed 13.1c, ton lot 14.25c, less ton 15.5c; Central, add 0.3c for c.l. add 0.75c for l.c.l.; Western, add 1.05c for c.l. and 5c for l.c.l. Freight allowed. Spot, add 0.3c.

85% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 13.3c per lb of contained Si, carload packed 14.55c, ton lot 15.55c, less ton 16.7c; Central, add 0.3c for c.l. and 0.7c for l.c.l.; Western, add 1.05c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk, 15c per lb of contained Si carload packed 16.2c, ton lot 17.15c, less ton 18.2c; Central, add 0.3c for c.l. and 0.65c for l.c.l.; Western, add 1c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Over 97% Si and 1% max. Fe.) Eastern Zone, c.l., lump, bulk, regular 17.3c per lb of Si, c.l. packed 18.5c, ton lot 19.4c, less ton 20.4c; Central, add 0.6c for c.l. and 2.25c for l.c.l.; Western, add 1.2c for c.l. and 4c for l.c.l. Add 1c for max. 0.20% calcium grade. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing over 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb cl 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c; smaller lots, 8.65c. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Eastern Zone, contract, carload, bulk, 12.5c per lb or briquet, carload packed 13.2c, ton lot 14.0c, less ton 14.9c; Central, add 0.25c for c.l. and 0.9c for l.c.l.; Western, add 0.35c for c.l. and 1.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

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Remelt Aluminum Prices Rise

Upward price trend continues as sellers raise quotations on foundry and steel deoxidizing grades. Platinum and mercury prices decline

New York — Price advances were posted last week on foundry grades and steel deoxidizing grades of secondary aluminum ingots, the former rising 1/2 to 3/4-cent a pound and the latter 1/4 to 1/2-cent a pound. Platinum and mercury prices have declined while major primary markets remained firm.

Copper — Despite projected shutdowns of many fabricating plants for vacations in July, demand for delivery of copper in that month has shown no letup from the recent active rate. Supply is still inadequate to satisfy fully customers' requirements, although no consumer is being forced to close his plant due to a lack of copper. Demand for the government's stockpile and ERP needs are cutting available supplies.

Chase Brass & Copper Co., Waterbury, Conn., has announced that its mills and factory will close for vacation on Friday night, July 2, and will reopen Monday, July 12. Included in the shutdown will be the Chase Metal Works plant and Waterbury Mfg. Co. fabricating plant in Waterbury, both of the brass mills in Cleveland, and the wire cloth mill at Turnpike, Pa. All departments of the mill offices in Waterbury and Cleveland will be operated as usual during the shutdown period. However, the Waterbury Mfg. Co.'s office will be closed. The 25 branch offices and warehouses will remain open to make shipments from warehouse stocks.

Earlier this month, C. Donald Dallas, chairman, Revere Copper & Brass Inc., informed a House subcommittee that a 1948 deficit in domestic copper production of about 500,000 tons confronts American industry. He recommended the accumulation of a brass scrap stockpile.

Copper mine output in April was at a daily rate 3 per cent above that for March and 6 per cent higher than in 1947, according to the Bureau of Mines, or at the respective daily average rate of 2460 tons and 2385 tons.

Lead — The Senate Finance Committee has approved and sent to the Senate floor a bill designed to stimulate the importation of lead by suspending import duties until June 30, 1949. The measure already had passed the House. In its report on the legislation, the House Ways and Means Committee said the lead shortage has made it necessary for many domestic producers of finished lead products to operate at reduced capacity. As a result, these firms have been unable to supply needs of the automotive, electrical, transportation and other consuming industries.

The legislation would suspend tariffs on lead-bearing ores, mattes of all kinds, lead bullion or base bullion, lead in pigs and bars, lead dross, reclaimed lead, scrap lead, antimonial lead and antimonial scrap lead with respect to imports entered for consumption or withdrawn from warehouses for use beginning immediately upon enactment of the bill.

Total stocks of lead at the works of smelters and refiners in the United States declined to 120,130 tons as of May 1 from 122,976 tons a month earlier and compared with 175,752 tons as of May 1, 1947. Stocks of refined lead increased, however, to 14,603 tons from 9517 tons on Apr. 1 and compared with 34,731 tons a year ago. Of the May 1 stocks, 70,796 tons were in ore and matte and in process at smelteries compared with 74,016 tons on Apr. 1; 11,304 against 9246 tons in base bullion at smelteries and refineries, 3140 against 10,338 tons in transit to refineries, and 15,437 against 13,539 tons in process at refineries. Stocks of antimonial lead totaled 4850 tons on May 1 against 5320 tons on Apr 1.

Smelter receipts of lead in ore and scrap held steady in April at 40,776 tons compared with 40,802 tons in March, according to the American Bureau of Metal Statistics. They showed a sharp drop, however, from the 49,451 tons reported for April, 1947. Due to labor trouble at Mexican mines during March and April receipts of foreign ore totaled only 2149 tons in April and 2796 tons in March compared with 8500 in February. Receipts of lead in scrap declined to 3265 tons from 3821 tons in March.

Zinc— Stocks of slab zinc held by smelters increased slightly in May to 43,934 tons from 42,910 tons at the beginning of the month and compared with 166,864 tons as of May 30, 1947, according to the American Zinc Institute Inc. Unfilled orders at the end of May totaled 71,018 tons, virtually unchanged from a month previously, and compared with 51,418 tons at the end of May, 1947. Production increased to 72,742 tons last month from 70,330 tons in April and compared with 73,970 tons in May, 1947. The daily average production rate held steady, however, at 2347 tons against 2341 tons in April. Shipments of slab zinc in May declined to 71,718 tons from 72,649 tons and compared with 70,803 tons a year ago. Last month's shipments consisted of the following: Domestic, 66,161 tons; export and drawback, 5468 tons; government account, 89 tons.

Tin — Combined Tin Committee has announced final allocations of metal for the first half of 1948, totaling 39,488 tons. Allocations on June 9 and total allocations for the first half were, respectively, as follows for the leading consuming countries: United States, 2550 tons and 20,400; France, 680 and 5440 tons; India, 350 tons and 2800; Canada, 270 tons and 2175 tons; Brazil, 75 tons and 1075 tons; and Poland, 130 tons and 1000 tons.

Platinum — The price of platinum has been reduced $10 an ounce by the leading refiner to the basis of $88 for bulk quantities and $91 an ounce for retail lots. The increased supply has come from people who bought the metal at lower levels as a hedge against inflation and from shipments to the United States from European countries, other than Russia. Demand has not been heavy.

Mercury — Sellers of mercury have reduced prices about $2 a flask to a range of $76 to $78, although little business was transacted last week at the new levels.

Power Shortage Restricts Aluminum Output in West

Seattle — Plans of the government to rebuild the air force will have a far-reaching effect on the West Coast's big aluminum industry. Aluminum producers in turn will be hard put to meet all demands for the light metal during the next five years. The reason is a serious shortage of electricity in the Pacific Northwest where this area's aluminum capacity is centered.

During 1948 the West Coast's production of primary aluminum will total about 573 million pounds, not far from half of the estimated U. S. total of 1250 million pounds indicated for this year.

Although much of the extreme wartime shortage of aluminum has been alleviated during the last year or two, the metal still is not plentiful and demand from ordinary civilian users continues to grow. As a result, prospects that the building of a 66-group air force will require an additional quarter of a billion pounds of aluminum in each of the next five years will make necessary additional productive capacity, or, failing that, a diversion of metal from civilian to rearmament purposes. It is likely the latter course will have to be followed, at least as far as the Pacific Northwest plants are concerned.

None of the western producers is able to obtain enough electricity to expand, and because addition of more hydroelectric facilities are years away, it's unlikely there'll be extra power for the metal makers.

Five aluminum plants, producing ingots, now are operating in the Northwest. Together they require nearly 600,000 kilowatts of power. But their needs for additional power total another 600,000 kilowatts.

Meanwhile, Aluminum Co. of Canada is surveying sites in British Columbia, near Vancouver, for installation of a large capacity aluminum plant which will be served by a new hydroelectric system. The plans for this plant still are in their early stages, however, and construction is unlikely to be completed for several years.

In California, work on another type of aluminum plant is getting under way with assembly of an aluminum foil plant at Permanente Metals Corp. plant near San Francisco.

This plant was purchased several months ago by Henry Kaiser's Permanente under the German reparations agreement and it is the first German plant to be sold to U. S. interests since the end of the last war.

The foil plant, first of its kind west of the Mississippi is expected to be in operation next fall. It will have a monthly capacity of 500,000 pounds and will employ 200 men.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic, 21.50c, Conn. Valley; Lake, 21.62½c Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 19.00-19.25c; 88-10-2 (No. 215) 29.00c; 80-10-10 (No. 305) 25.25c; No. 1 yellow (No. 405) 15.25-16.00c. Prices include 25 cents per 100 lb freight allowance.

Zinc: Prime western 12.00c, brass special 12.25c, intermediate 12.50c, East St. Louis; high grade 13.00c, delivered.

Lead: Common 17.30-17.35c; chemical and corroding 17.40c, St. Louis.

Primary Aluminum: 99% plus, ingots 15.00c, pigs 14.00c; metallurgical 94% min. 13.50c. Base prices for 10,000 lb and over, fob shipping point, freight allowed.

Secondary Aluminum: Piston alloy (No. 122 type) 19.75-20.75c; No. 12 foundry alloy (No. 2 grade) 19.50-20.25c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 20.75-21.75c; grade 2 20.25-21.00c; grade 3, 19.75-20.50c; grade 4 19.00-20.00c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, fob Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.028; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.649% $1.024, grade F, 98-98.999% $1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American, 99-99.8% and over but not meeting specifications below, 35.00; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 35.50c, fob Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 33.75c; 25-lb pigs, 35.25c; shot, 36.25c; "F" nickel shot or ingots, for addition to cast iron, 34.25c. Prices include import duty.

Mercury: Open market, spot, New York $76-$78 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $20.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $1.75, del.; Special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 per lb for 550 lb (keg); $1.67 per lb for 100 lb (case); $1.72 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 74.62½c per ounce.

Platinum: $88-$91 per ounce.

Palladium: $24 per troy ounce.

Iridium: $110-$120 per troy ounce.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, fob mill.)

Sheet: Copper 33.68c; yellow brass 30.16c; commercial bronze, 95% 33.80c, 90% 33.27c; red brass, 85% 32.23c, 80% 31.70c; best quality 31.09c; Everdur, Duronze, Herculoy or equiv., hot-rolled, 38.56c; nickel silver, 18%, 42.42c; phosphor bronze, grade A, 5%, 52.70c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.69c; commercial bronze, 95% 33.49c, 90% 32.96c; red brass, 85% 31.92c, 80% 31.39c.

Seamless Tubing: Copper 33.72c; yellow brass 32.92c; commercial bronze 90% 35.68c; red brass 85% 34.89c, 80% 34.36c.

Wire: Yellow brass 30.45c; commercial bronze, 95% 34.09c, 90% 33.56c; red brass, 85% 32.52c, 80% 31.99c; best quality brass 31.38c.

Copper Wire: Bare, soft, fob eastern mills, c.l. 26.80c, l.c.l. 27.30c; weatherproof, fob eastern mills, c.l. 27.35c, l.c.l. 27.85c; magnet, delivered, c.l. 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, l.c.l. 30.50c-31.88c.

ALUMINUM

(Base prices, fob shipping point)

Sheets and Circles: 2s and 3s mill finish c.l., fob shipping point.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	24.0	...	...
0.135-0.126	12-48	24.5	...	...
0.125-0.096	12-48	24.5	23.1	26.3
0.095-0.077	12-48	25.0	23.2	26.5
0.076-0.061	12-48	25.5	23.4	26.7
0.060-0.048	12-48	25.7	23.6	27.0
0.047-0.038	12-48	26.1	23.8	27.3
0.037-0.030	12-48	26.4	24.1	27.7
0.029-0.024	12-48	26.8	24.4	28.1
0.023-0.019	12-36	27.4	24.8	28.6
0.018-0.017	12-36	27.9	25.3	29.3
0.016-0.015	12-36	28.6	25.9	30.1
0.014	12-24	29.4	26.6	31.1
0.013-0.012	12.24	30.2	27.3	32.0
0.011	12-24	31.1	28.1	33.1
0.010-0.0095	12-24	32.1	29.0	34.3
0.009-0.0085	12-20	33.2	30.0	35.7
0.008-0.0075	12-20	34.4	31.1	37.1
0.007	12-18	35.7	32.3	38.8
0.006	12-18	37.0	33.5	42.6

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: Cents per pound, 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T	17S-T	—Hexagonal— R317-T	17S-T
0.125	45.0	44.0	...	...
0.156-0.203	38.5	37.5	...	...
0.219-0.313	35.5	34.5	...	...
0.344	34.0	33.0	...	...
0.375	33.0	32.0	42.5	40.0
0.406	33.0	32.0	...	...
0.438	33.0	32.0	42.5	40.0
0.469	33.0	32.0	...	...
0.500	33.0	32.0	42.5	40.0
0.531	33.0	32.0	...	...
0.563	33.0	32.0	40.5	38.0
0.594	33.0	32.0	...	...
0.625	33.0	32.0	40.5	38.0
0.656	33.0	32.0	...	...
0.688	33.0	32.0	40.5	38.0
0.750-1.000	32.0	31.0	37.0	35.5
1.063	32.0	31.0	35.5	34.0
1.125-1.500	31.0	30.0	35.5	34.0
1.563	31.0	30.0	...	...
1.625	30.0	29.0	34.5	33.0
1.688-2.000	30.0	29.0	...	...
2.125-2.500	29.5	28.5	...	...
2.625-3.375	28.5	27.5	...	...

LEAD

(Prices to jobbers, fob Cleveland, Pittsburgh)

Sheets: Full rolls, 140 sq ft or more, $20.85 per cwt.; add 50c per cwt., 10 sq ft to 140 sq ft; $1.25, less than 10 sq ft; $1, circles and segments. Pipe: Full coils, $20.10 per cwt; cut coils, $20.35. Traps and Bends: List price plus 52%.

ZINC

Sheets, 16.50c-17.00c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 15.25c-16.00c, fob mill, 36,000 lb and over. Plates, not over 12-in., 14.25c; over 12-in., 15.25c.

NICKEL

(Base prices, fob mill.)

Sheets, cold-rolled, 54.00c. Strip, cold-rolled, 60.00c Rods, hot-rolled 50.00c, cold-finished 55.00c. Angles, hot-rolled, 50.00c. Plates, 52.00c. Seamless tubes, 83.00c.

MONEL

(Base prices, fob mill.)

Sheets, cold-rolled 43.00c; No. 35, 41.00c Strip, cold-rolled, 44.00c. Rods, hot-rolled 39.00c; cold-finished 44.00c. Angles, hot-rolled, 39.00c. Plates, 41.00c. Seamless tubes, 71.00c. Shot and blocks, 31.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb. 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9%, flake, fob Philadelphia, carloads, 22.00c; 5 tons and over 22.50c; 1 to 5 tons, 23.00c; less than 1 ton, 23.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 44.00c, fob Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 15.00c; 1000 to 19,900 lb, 14.00c fob Niagara Falls, N. Y.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.00c; over 250 lb, 24.00c, fob Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; fob Cleveland. Add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 23.50c; 275-lb, or 500-lb bbls. 21.50c, fob Cleveland.

Tin Anodes: Bar, 1000 lb and over 110.00c; 500 to 999 lb, 110.50c; 200 to 499 lb, 111.00c; less than 200 lb, 112.50c; ball, 1000 lb and over, 112.25c; 500 to 999 lb. 112.75c; 200 to 499 lb, 113.25c; less than 200 lb, 114.75c, fob Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers and resellers, 67.4c; 100 or 300 lb drums only, 100 to 500 lb, to consumers 59.2c, to resellers 54.8c; 600 to 1900 lb, to consumers 56.8c, to resellers 52.5c; 2000 to 9900 lb, to consumers 55.0c, to resellers 50.9c; 10,000 lb or more l.c.l., to consumers 53.9c, to resellers 49.9c; carloads, to consumers 52.7c, to resellers 48.7c. Prices fob Sewaren, N. J.

Zinc Cyanide: 100-lb drums 37.25c, fob Cleveland; 37.00c, Detroit; 36.00c, fob Philadelphia.

Stannous Sulphate: Less than 2000 lb, in 100 lb kegs, 96.50c, in 400 lb bbl, 95.50c; more than 2000 lb, in 100 lb kegs, 95.50c, in 400 lb bbl, 94.50c.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)

Prices in cents per pound for less than 15,000 lb fob shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.625	15.375	14.750
Commercial Bronze			
95%	18.125	17.875	17.375
90%	17.625	17.375	16.875
Red brass			
85%	17.500	17.250	16.750
80%	17.250	17.000	16.500
Best Quality (71-79%)	16.625	16.375	15.875
Muntz Metal	14.750	14.500	14.000
Nickel silver, 5%	16.500	16.250	8.250
Phos. bronze, A. B.	20.750	20.500	19.500
Naval brass	15.250	15.000	14.500
Manganese bronze	15.250	15.000	14.375

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.25, No. 2 copper 17.25, light copper 16.25, composition red brass 14.50-14.75, auto radiators 11.75-12.00, heavy yellow brass 10.50-10.75, brass pipe, 11.50-11.75.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 18.50, No. 2 copper 17.50, light copper, 16.50, refinery brass (60% copper), per dry copper content 16.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 16.50-16.75, No. 2 15.50-16.00, light copper 14.50-14.75, No. 1 composition red brass 12.75-13.00, No. 1 composition turnings 12.25-12.50, mixed brass turnings 7.25-7.50, new brass clippings 12.50-13.00, No. 1 brass rod turnings 10.00-10.50, light brass 6.50-7.00, heavy yellow brass 9.00-9.25, new brass rod ends 10.50-11.00, auto radiators, unsweated 10.00-10.25, cocks and faucets 10.00-10.25, brass pipe 10.00-10.25.

Lead: Heavy 15.50-16.00, battery plates 9.50-10.00, linotype and stereotype 17.00-17.50, electrotype 15.00-15.50, mixed babbitt 14.25-14.75, solder joints, 18.75-19.25.

Zinc: Old zinc 5.75-6.00, new die cast scrap 4.75-5.25, old die cast scrap 2.75-3.25.

Tin: No. 1 pewter 65.00-67.00, block tin pipe 83.00-84.00, auto babbitt 51.00-53.00, No. 1 babbitt 51.00-54.00, siphon tops 50.00-52.00.

Aluminum: Clippings 2S 10.50-11.00, old sheets 8.50-9.00, crankcases 8.50-9.00, borings and turnings 4.00-4.50, pistons, free of struts, 8.50-9.00.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
May Avg.	21.500	17.325	12.000	94.000	15.000	33.700	33.750	74.625
June 1-10	21.500	17.30-17.35	12.000	103.000	15.000	35.500	33.750	74.625

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$40.00-40.50*
No. 2 Heavy Melt. Steel	40.00-40.50*
No. 1 Busheling	40.00-40.50*
Nos. 1, 2 & 3 Bundles	40.00-40.50*
Machine Shop Turnings	36.50-37.00
Mixed Borings, Turnings	36.50-37.00
Short Shovel Turnings	37.00-37.50
Cast Iron Borings	36.50-37.00
Bar Crops and Plate	47.50-48.00
Low Phos. Steel	47.50-48.50
Heavy Turnings	39.50-40.00

Cast Iron Grades

No. 1 Cupola	64.00-65.00
Charging Box Cast	53.00-54.00
Heavy Breakable Cast	56.00-58.00
Unstripped Motor Blocks	52.00-53.00
Malleable	69.00-70.00
Brake Shoe	52.00-53.00
Clean Auto Cast	58.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.00-41.50
R.R. Malleable	75.00-80.00
Axles	51.50-52.00
Rails, Rerolling	56.00-58.00
Rails, Random Lengths	54.00-56.00
Rails, 3 ft and under	61.50-62.00
Rails, 18 in. and under	62.50-63.50
Railroad Specialties	54.00-55.00
Uncut Tires	52.00-52.50
Angles, Splice Bars	53.00-54.00

* Plus applicable freight springboard.

CLEVELAND

No. 1 Heavy Melt. Steel	$39.50-40.00*
No. 2 Heavy Melt. Steel	39.50-40.00*
No. 1 Busheling	39.50-40.00*
Nos. 1 & 2 Bundles	39.50-40.00*
Machine Shop Turnings	34.50-35.00
Mixed Borings, Turnings	34.00-36.00
Short Shovel Turnings	35.50-36.00
Cast Iron Borings	35.50-36.00
Bar Crops and Plate	44.50-45.00
Punchings & Plate Scrap	44.50-45.00
Heavy Turnings	39.50-40.50
Alloy Free Turnings	37.50-38.50
Cut Structurals	46.00-49.00

Cast Iron Grades

No. 1 Cupola	67.00-69.00
Charging Box Cast	58.00-60.00
Stove Plate	58.00-60.00
Heavy Breakable Cast	54.00-56.00
Unstripped Motor Blocks	58.00-60.00
Malleable	73.00-75.00
Brake Shoes	52.00-53.00
Clean Auto Cast	68.00-70.00
No. 1 Wheels	58.00-60.00
Burnt Cast	56.00-57.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.50*
R.R. Malleable	73.00-78.00
Rails, Rerolling	57.00-58.00
Rails, Random Lengths	56.00-57.00
Rails, 3 ft and under	61.00-63.00
Cast Steel	56.00-58.00
Railroad Specialties	53.00-55.00
Uncut Tires	56.00-57.00
Angles, Splice Bars	57.00-59.00

* Plus applicable freight springboard.

VALLEY

No. 1 Heavy Melt. Steel	$40.00-40.50*
No. 2 Heavy Melt. Steel	40.00-40.50*
No. 1 Bundles	40.00-40.50*
Machine Shop Turnings	34.50-35.50
Short Shovel Turnings	36.50-37.00
Cast Iron Borings	36.00-36.50
Low Phos.	46.00-47.50*

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.50*

* Plus applicable freight springboard.

MANSFIELD

Machine Shop Turnings	$35.00-35.50
Short Shovel Turnings	37.00-37.50

CINCINNATI

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
Nos. 1 & 2 Bundles	39.50
Machine Shop Turnings	33.50
Mixed Borings, Turnings	32.50
Short Shovel Turnings	35.50
Cast Iron Borings	34.50

Cast Iron Grades

No. 1 Cupola Cast	55.00
Charging Box Cast	43.00
Heavy Breakable Cast	50.00
Stove Plate	47.00
Unstripped Motor Blocks	45.00
Brake Shoes	45.00
Clean Auto Cast	55.00
Drop Broken Cast	60.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50
R.R. Malleable	68.00
Rails, Rerolling	53.00
Rails, Random Lengths	50.00
Rails, 18 in. and under	60.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$35.00-35.50
No. 1 Busheling	35.00-35.50
Nos. 1 & 2 Bundles	35.00-35.50
No. 3 Bundles	35.00-35.50
Machine Shop Turnings	29.00-29.50
Mixed Borings, Turnings	29.00-29.50
Short Shovel Turnings	30.00-30.50
Cast Iron Borings	30.00-30.50
Punchings & Plate Scrap	40.00-40.50

Cast Iron Grades

No. 1 Cupola Cast	58.00-60.00
Heavy Breakable Cast	48.00-50.00
Clean Auto Cast	60.00-62.00

BUFFALO

No. 1 Heavy Melt. Steel	$43.00-45.00
No. 2 Heavy Melt. Steel	39.75-40.25
No. 1 Busheling	39.75-40.25
No. 1 & 2 Bundles	39.75-40.25
Machine Shop Turnings	34.75-35.25
Mixed Borings, Turnings	34.75-35.25
Cast Iron Borings	35.50-36.00
Short Shovel Turnings	35.50-36.00
Low Phos.	44.75-45.25

Cast Iron Grades

No. 1 Cupola	64.00-65.00
Mixed Cupola	60.00-62.00
Heavy Breakable Cast	55.00-57.00
Malleable	70.00-75.00
Clean Auto Cast	62.00-64.00

Railroad Scrap

Rails, 3 ft. and under	53.00-55.00
Railroad Specialties	51.00-53.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$42.00-43.00
No. 2 Heavy Melt. Steel	39.00
No. 1 Busheling	39.00
Nos. 1 & 2 Bundles	39.00
No. 3 Bundles	37.00
Machine Shop Turnings	34.00-35.00
Mixed Borings, Turnings	34.00-35.00
Short Shovel Turnings	34.00-35.00
Bar Crop and Plate	47.50-48.00
Punchings & Plate Scrap	46.50-47.50
Cut Structurals	46.50-47.50
Elec. Furnace Bund'es.	43.50-44.50
Heavy Turnings	42.50-43.00
No. 1 Chemical Borings	42.00-43.00

Cast Iron Grades

No. 1 Cupola Cast	63.00-65.00
No. 1 Machinery Cast	66.00-67.00
Charging Box Cast	61.50-62.50
Heavy Breakable Cast	61.50-62.50
Unstripped Motor Blocks	59.50
Malleable	76.00-78.00
Clean Auto Cast	64.00
No. 1 Wheels	68.00-70.00

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.50
No. 2 Heavy Melt. Steel	34.50
No. 1 Busheling	34.50
Nos. 1 & 2 Bundles	34.50
No. 3 Bundles	32.50
Machine Shop Turnings	28.50-29.00
Mixed Borings, Turnings	28.50-29.00
Short Shovel Turnings	30.50-31.00
Punchings & Plate Scrap	40.00-41.00
Cut Structurals	40.00-41.00
Elec. Furnace Bundles	40.00-41.00

Cast Iron Grades

No. 1 Cupola Cast	55.00-57.00
Charging Box Cast	56.00-58.00
Heavy Breakable	56.00-58.00
Unstripped Motor Blocks	52.50-53.50
Malleable	68.00-69.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$31.90
No. 2 Heavy Melt. Steel	31.90
No. 1 Bundles	31.90
No. 1 Busheling	31.90
Machine Shop Turnings	26.90
Mixed Borings, Turnings	26.90
Short Shovel Turnings	28.90
Bar Crops and Plate	35.00-37.00
Punchings & Plate Scrap	35.00-37.00
Chemical Borings	37.00-37.50

Cast Iron Grades

No. 1 Cupola Cast	50.00-52.00
Heavy Breakable Cast	53.00
Stove Plate	50.00
Unstripped Motor Blocks	48.00
Clean Auto Cast	50.00-52.00

CHICAGO

No. 1 Heavy Melt. Steel	$39.00-39.50
No. 2 Heavy Melt. Steel	39.00-39.50
No. 1 Bundles	39.00-39.50
No. 2 Bundles	39.00-39.50
No. 3 Bundles	37.00-37.50
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Short Shovel Turnings	36.00-36.50
Cast Iron Borings	35.50-36.00
Bar Crops and Plate	46.50-47.00
Punchings	48.00-48.50
Elec. Furnace Bundles	40.00-40.50
Heavy Turnings	38.50-39.00
Cut Structurals	44.00-44.50

Cast Iron Grades

No. 1 Cupola Cast	65.00-70.00
Clean Auto Cast	65.00-70.00
No. 1 Wheels	61.00-62.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.25-44.25
Malleable	75.00-76.00
Rails, Rerolling	53.00-54.00
Rails, Random Lengths	51.00-52.00
Rails, 3 ft and under	56.00-57.00
Rails, 18 in. and under	58.00-59.00
Railroad Specialties	52.00-53.00
Angles, Splice Bars	52.00-53.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$40.50-41.00
No. 2 Heavy Melt. Steel	37.50-38.00
Machine Shop Turnings	32.50-33.50
Short Shovel Turnings	34.50-35.50

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	65.00-67.00
Mixed Cast	59.00-60.00
Heavy Breakable Cast	55.00-56.00
Brake Shoes	57.00-58.00
Clean Auto Cast	65.00-67.00
Burnt Cast	59.00-60.00

Railroad Scrap

R.R. Malleable	65.00-70.00
Rails, Rerolling	50.50-52.50
Rails, Random Lengths	50.00-51.00
Rails, 3 ft and under	56.00-58.00
Uncut Tires	48.00-49.00
Angles, Splice aBrs	55.00-56.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$37.50
No. 2 Heavy Melt. Steel	37.50
No. 1 Busheling	37.50
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	35.00
Long Turnings	24.50
Short Shovel Turnings	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	40.00
Cut Structurals	38.00

Cast Iron Grades

No. 1 Cupola Cast	63.00
Stove Plate	60.00-62.00
No. 1 Wheels	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	nom.
Axles, Steel	50.00
Rails, Rerolling	53.00-55.00
Rails, Random Length.	45.00-48.00
Rails, 3 ft and under	53.00-55.00
Angles and Splice Bars	52.00-53.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$25.00
No. 2 Heavy Melt. Steel	*25.00
No. 1 Busheling	*25.00
Nos. 1 & 2 Bundles	*25.00
No. 3 Bundles	*20.00
Machine Shop Turnings	*15.50
Bar Crops and Plate	25.00
Cast Steel	25.00
Alloy Free Turnings	15.50
Cut Structurals	25.00
Tin Can Bundles	20.00

Railroad Scrap

No. 1 Heavy Melting	26.00
Axles	32.00
Rails, Random Lengths	26.50
Uncut Tires	33.50

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$26.00
No. 2 Heavy Melt. Steel	26.00
No. 1 Busheling	26.00
Nos. 1 & 2 Bundles	22.00-23.00
No. 3 Bundles	22.00-23.00
Machine Shop Turnings	14.50-16.50
Mixed Borings, Turnings	14.50-16.50
Punchings & Plate Scrap	26.00-28.00
Cut Structurals	26.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	40.00
Charging Box Cast	25.00
Heavy Breakable Cast	24.00
Stove Plate	25.50
Unstripped Motor Blocks	24.00
Malleable	30.00
Brake Shoes	30.00
Clean Auto Cast	30.00
No. 1 Wheels	26.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Railroad Malleable	30.00
Rails, Random Lengths	21.50
Angles and Splice Bars	23.00

LOS ANGELES

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	25.00
Nos. 1 & 2 Bundles	25.00
Machine Shop Turnings	16.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles.	28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melt.	$22.00
No. 1 Bundles	22.00
Mechanical Bundles	20.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	28.00
Rails, Rerolling	26.00
Bushelings	17.00
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	42.00-48.00
No. 2 Cast	35.00-37.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

Sheets, Strip . . .

Various allocations programs give added pinch to already tight supply situation

Sheet Prices, Page 144

New York — Flat-rolled tonnage lost during the coal strike will come out of some mills' July quotas and next month looms as a lean one for sheet consumers. Housing program allocations also will affect sheet allocations, but not to the extent the car building program will. Currently, car building shops are taking a substantial slice of mill production. Hot-rolled carbon and galvanized sheets are among the tightest products and allocations of both are down slightly. Demand for both sheets and strip is well in excess of supply. While there is some slackening in consumer goods activity, this has not been reflected yet at the mill level.

Boston — Nonintegrated cold strip producers are confronted with growing shortages on low-carbon hot-rolled strip for cold reduction. With inventories out of balance, operating schedules are subject to frequent revisions which in turn affect consumers' supply. The reverse is true of alloys, there being ample supply of hot-rolled in most grades. Several cold mills have lost sources for the supply of hot carbon strip and are getting lower allocations from the other suppliers. One eastern producer is not rolling anything below 0.50 carbon and is on a f.o.b. basis for most products. Considerable cold strip tonnage is selling now on a f.o.b. basis in this territory.

Pittsburgh — Most sheet sellers expect to clear up carryover tonnage during July, barring disruption to production which might result from cessation of coal mining operations during that period. Slight easing in consumer demand for electrical appliances has not yet been reflected in order cancellations at the mill level. Output of sheets and strip is still falling far short of meeting urgent requirements of many consumers and remains major production bottleneck in assembly schedules. Demand for stainless sheets and strip has recorded moderate improvement in recent weeks, although order backlogs are not uniformly extended among the various producers. Delivery promises on stainless sheets are extended 6 to 8 weeks in some instances and up to 3 months in others; strip generally is not available until October. Fairly current deliveries still are available for stainless bars, plates, wire, etc.

Cleveland — Prospects of procuring hot-rolled carbon sheets except under allocations are becoming even dimmer now that producers must spread their output over the home heating and atomic energy programs in addition to the railroad car program. Reflecting this situation, September allotments of one producer provide a reduced percentage of hot-rolled carbon sheets for uses not under voluntary allocations. Although the home heating and atomic energy allocations programs officially begin in July, some producers already had scheduled their July and August production when the two new programs were announced and thus were unable

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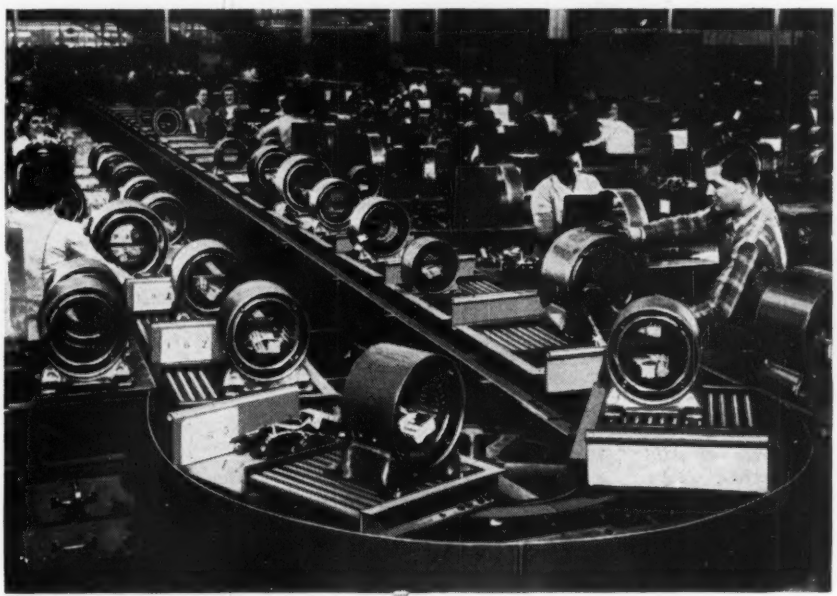

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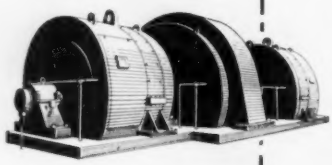

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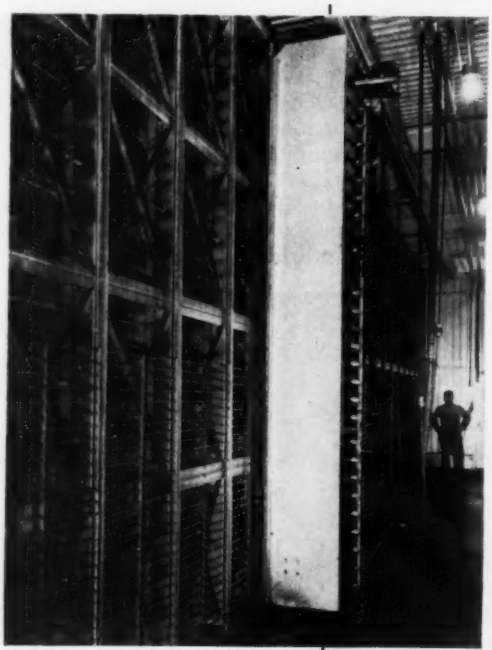

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to start participating in them until September. In such instances, however, the producers will make up for July and August in the remaining months of those programs.

Recognizing the gloomier outlook for hot-rolled sheets, some consumers are attempting to get cold-rolled sheets instead, but because of the tight supply-demand situation in that product their efforts are largely in vain.

Chicago — With third quarter almost at hand, flat-rolled product consumers are disturbed over the reduced tonnages they are to receive during this period. The coal strike, which reduced steel production, coupled with an increasing carryover, forced virtually all sheet and stripmakers to revise customers' third quarter quotas downward and the full impact is about to be felt. Mills report no slackening in demand for all types of sheets and strip; in fact, the reduced quotas have tightened the situation and have resulted in stronger pressure for deliveries. More manufacturing plants than ever before plan to shut down for mass vacations this summer and during this period they hope to build up steel inventories.

Cincinnati — Demand for sheets shows no signs of relaxing, and announcement of reduced allotments for the third quarter has incited further pressure for tonnage. Mills anticipate possible dislocation of schedules because of the government-sponsored heating furnace program, but it may be slight because of the volume already earmarked for established customers. Requirements for the atomic energy projects represent new tonnage. Currently the widest gap between supply and demand is in hot-rolled. Price policies in the district are unchanged.

Birmingham—Sheet users say the best that can be said of the supply situation here is that it probably is no worse. Need for sheets probably will not decline in the foreseeable future and, although some additional tonnage is in prospect through conversion to cold rolled at Fairfield, demands likely can not be met. Warehouse stocks of sheets are especially low.

St. Louis — Adjustment difficulties in equipment continue to hold this district's sheet production to about 40 per cent of capacity, although it is expected to rise to its 40,000-ton monthly capacity by the yearend. Timing of the speeds of the various parts of Granite City Steel's new cold reduction installation is giving trouble. Auxiliary units compel a low rate of operation, and the personnel still lacks experience in handling the modern equipment. "Bugs" in the temper mill and shear line have been worked out. Granite City is making deliveries now promised in January and February. It expects to be current by the end of July, for the reason no new orders have been accepted in months. None will be taken until the production outlook is clearer. Lack of iron, plus the delay entailed in use of pig instead of hot metal, may reduce sheet production somewhat for a 60-day period. Demand for sheet deliveries is so intense Granite City is making a "goodwill" survey of its customers to determine their reaction to the mill's two-year postwar series of production interruptions.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 144

Boston — Reinforcing steel inquiry is heavier and in excess of ability of most distributors to supply. Highway needs are especially high. Contractors with old established suppliers are usually successful in obtaining reinforcing steel, but those who in the past shopped around without firm connections experience difficulty. Housing also accounts for a substantial volume.

Seattle — Rolling mill capacity is overtaxed by a steady volume of reinforcing bar orders in small tonnages, much of it for school construction and small business plants. Output of local plants has been reduced by a two-week shutdown of Bethlehem Pacific Coast Steel Corp.'s Seattle mill and restricted operations of Northwest Steel Rolling Mills Inc. Heavy public works demands for reinforcing are pending.

Steel Bars . . .

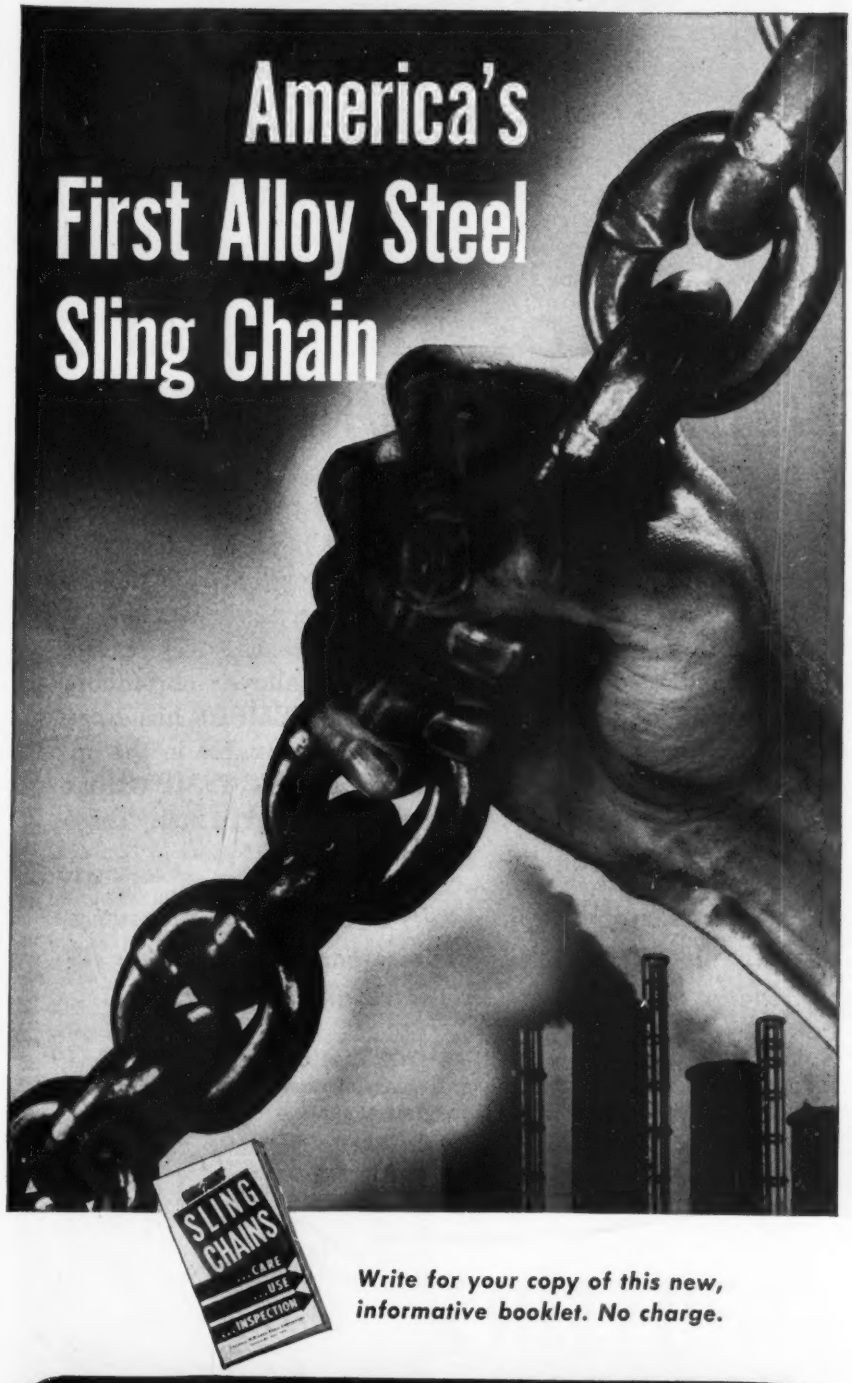
Bar Prices, Page 144

Pittsburgh — Cold-finished carbon and alloy bar demand shows no signs of leveling off, with producers reporting inability to make inroads against order backlogs. However, demand-supply situation has not reached the point with most interests to force them to go on an allocation basis, such as inaugurated by Jones & Laughlin Steel Corp. a few weeks ago. Jones & Laughlin continues to sell cold-finished carbon bars into the Detroit area at $3.61 per hundred pounds. Most other producers are selling on a Cleveland base plus freight. Most sellers are unable to promise definite delivery schedules on cold-finished carbon bars 3 inches and under. Order backlogs on an average are extended into September and November on cold-finished items; electric furnace alloy steels, 10 to 12 weeks; open-hearth alloys, into October. Integrated mills have not scheduled new orders for July shipment in an effort to make up carryover tonnage lost during the industrial gas shortage and coal strike periods earlier this year. A coal strike early in July would be almost immediately reflected in reduced production schedules in carbon bars.

Boston — While third quarter allocations on carbon bars approximate those for the preceding period, carryovers in some cases will cut into quotas; hot-rolled carbon stock is short in more sizes, both rounds and flats. Depending on size and grade, there are at least three basing points covering New England distribution: Buffalo, Bethlehem and Pittsburgh, the latter for bessemer along with Youngstown. Bulk of carbon tonnage moves on a Buffalo base, including cold-finished. Among forge shops there is some heavier swing to alloys, partly due to aircraft work; open hearth alloys are extended to November with some producers, but electric furnace alloys are available in nine to 10 weeks. Among the larger users of bars, textile machinery builders generally have inventories in balance.

New York — Demand for hot-rolled carbon bars is heavier with third quarter allocations somewhat reduced in numerous instances. A high ratio

CM HERC-ALLOY



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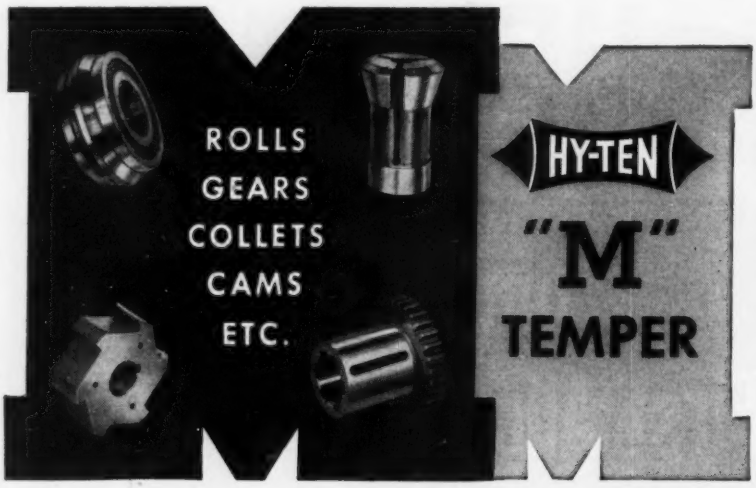

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of hot carbon bars is going to cold finishers and some users, normally taking hot bars, are substituting cold-finished. Deliveries on the latter are frequently extended to September. Deliveries on open-hearth alloys are also lengthening and demand to some extent reflects armament program. Some forge shops are doing more aircraft work.

Cleveland — Studying needs of the defense program, two northeastern Ohio companies have been making inquiries concerning alloy steel bars and other requirements for tank track production. However, this tank program, which is sizable, is still largely in the "talking" stage.

Plates . . .

Plate Prices, Page 145

Boston — More plate tonnage is earmarked for specific programs, leaving a shrinking volume for tank fabrication and miscellaneous industrial needs. Selective selling keeps carbon plates scarce, with mills accepting orders for that grade heavily loaded. Alloy, fire box and flanged steel are also tighter. There is a wide range in prices. Clad plates are going to the paper and chemical industries in fair volume. Delivery on pressed heads ranges from 10 to 16 weeks, depending on size with spun heads in August; floor plates are also extended to that month. Five 28,000-ton tankers with a capacity of 240,000 barrels each will be built at Quincy, Mass., for the Standard Oil Co. of California, taking close to 50,000 tons of plates and shapes. The tankers are scheduled for delivery in 1950 and 1951. The growing backlog in commercial ships at the Quincy yard is significant; this yard has until now concentrated largely on war craft.

Only one bidder, Enterprise Galvanizing Co., Philadelphia, quoted f.o.b. works for services and materials to galvanize government-furnished grade M medium steel plates for the Portsmouth, N. H., navy yard.

New York — Although plate mills are accepting new volume cautiously and attempting to reduce carryovers, more and more tonnage is being assigned for specific programs under voluntary allocation. For Atomic Energy Commission projects, 66,700 tons of plates have been allocated to 13 producers. Of the 160,500 tons of steel required, plates are the largest item. Less volume remains for regular industrial quotas, notably in carbon grades. Tank builders are unable to obtain required tonnages. Tighter, also, are low-alloy high-tensile and other specialties.

Birmingham—Plate users continue to canvass the market in search of materials. Quite a tonnage, in the aggregate, moves to the district in this manner, but with suspension of allocations from a leading producer's mill in this district, the pinch will become increasingly felt by mid-summer. Car building requirements are pretty well taken care of from local sources, but other users suffer.

Seattle — Increasing shortage of plates is hampering plant operation, management being unwilling to bid on jobs beyond available supplies. There is a steady volume of jobs involving small tonnages but the future is not promising because of the inability of mills to meet demands.

Wire . . .

Wire Prices, Page 145

Pittsburgh — Supply of spring wire has improved, reflecting in part an easing in demand for bedsprings, etc. Demand for fine wire specialties also has receded. Pressure for deliveries of coarse wire shows no signs of easing. Occasional openings in rolling schedules are promptly filled and, in general, overall order backlogs remain far extended. Some integrated interests have been able to resume near-normal operations following sharp curtailment in operating schedules during period of reduced wire rod shipments from the mills resulting from the coal strike.

Boston — There are few wire products in balance with demand, but among them is music wire which can be furnished from stock in some sizes. Allocations are accepted in full by most users of wire, and, while quotas in some instances are substantially higher than former consumption, inventories are frequently out of balance. An example is preformed staple wire, a low carbon grade. Demand for this wire is about double prewar with stapling employed for fastening of heavier work. Card wire, including shaped, is in heavy demand with no letdown in cold heading, resulphurized, screw stock and manufacturers wire.

Birmingham — Wire shortage seesaws back and forth; first one item is critical, then another. The summer season has strained available supplies of agricultural wire, especially fencing and baling wire, although some measure of relief is reported in nails.

Tubular Goods . . .

Tubular Goods Prices, Page 145

Boston — Although the overall supply of merchant steel pipe to distributors is tight, and even more stringent with utilities, the position of pipe mills as regards quotas and deliveries varies widely. Several mills set third quarter allocations on a par with second, being nearly current on delivery schedules; probably more have sharply reduced tonnage for the period and are delinquent on shipments. There is considerable jockeying in pipe distribution for New England is still an attractive area for most Pittsburgh producers. While jobbers experience some slack in new orders, backlogs are heavy and there is no reflection at mill levels. Wrought iron pipe demand is heavy and tonnage is allocated, but this commodity is relatively not as short as most tubular products; jobbers distributing both steel and wrought iron are getting a higher ratio of the latter as compared with normal. A new and promising market for wrought iron pipe is radiant heating, including service station snow and ice melting systems; applications got a boost from the 1947-48 winter.

Seattle — Agencies are unable to meet a large potential demand for cast iron pipe in this area because of heavy mill backlogs which cannot make better than 24-month deliveries. Competing types of pipe are being purchased in cases where prompt action is necessary. Many projects have been postponed.

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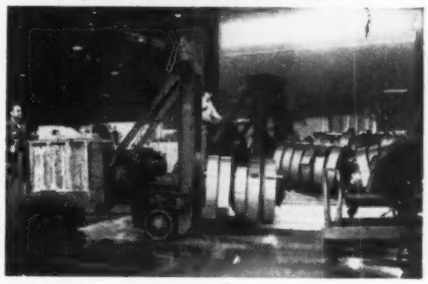
Two Baker Ram Trucks taking steel from end of hot strip mill. Original truck in foreground. Loads exceed 6000 lbs.



On February 13, 1923, the first ram truck ever built for handling coiled strip went into service for a large steel mill in Ohio. Since then, this Baker Truck has been operating continuously—usually 24 hours per day. For 25 years it has been on the same job, taking coiled steel from the hot strip mill to storage. As of January 1, 1948, this truck had handled 4,080,297 tons of steel *and is still going strong!*

This truck, the forerunner of modern Fork, Ram and Hy-Lift Trucks, performed so well that five more like it were purchased during the next two years. These, too, have given continuous service—24 hours per day—and are still on the identical jobs for which they were purchased a quarter of a century ago. It is conservatively estimated that these six trucks have handled a total of over 16,000,000 tons of steel—averaging only about one day per month out of service for maintenance.

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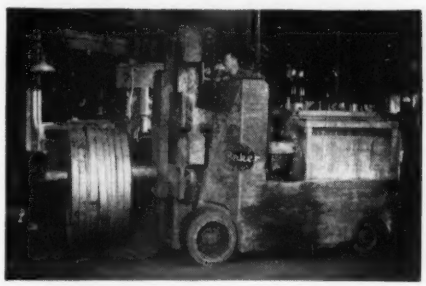

More recently this mill has purchased several modern Baker Ram trucks—like this 12,000 lb. model handling coils from end of welding line.

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Structural Shapes . . .

Structural Shape Prices, Page 145

Boston — Structural shops, confronted with further reductions in allocations, experience difficulty in buying fill-in tonnage and are more cautious in making forward commitments; promised delivery on some lots of fabricated structural steel, is endangered. Substantial part of backlogs held by smaller shops has been placed on a delivery basis, the larger units being extended five to six months. Some work is being postponed by high costs with quotations on fabricated material frequently up to 12 cents a pound and beyond. Those bidding firm prices allow liberally for contingencies.

New York — Structural fabricating shops here are hampered by lack of balance in plain material and, with allocations reduced in some instances, are estimating new work close to potential tonnage. Larger shops promise delivery in five to six months, but small units are taking contracts for around three months. Structural mills have blanked out July in some instances and will ship a smaller tonnage to warehouses this quarter.

Chicago — Structural fabricators are fairly well booked for the balance of the year. Since they will receive reduced shipments of plain shapes in third quarter, few shops in this district are seeking additional commitments for the near future. Although volume of new inquiry is not as heavy as it was some months ago, the total is larger than can be accommodated by the supply of steel. There is little competition for going business; the tendency is for jobs to seek fabricators.

Cleveland — To adjust for a decline in receipts of steel, one fabricator has reduced working hours from 52 to 40 hours a week, although demand for fabricated products continues unabated. Near-term improvement in supply is not anticipated in view of various allocation programs. Model changes in the automobile industry and consequent retooling are being reflected in increased demand for machinery bases of fabricated structurals and plate.

Birmingham — A fair volume of shape tonnage is noted in this district, most of it going into comparatively small construction and into stadium work. Inquiries for prospective needs are reasonably regular and some sizable tonnage is involved.

Seattle — Fabricating plants report ample backlogs and in view of steel shortages becoming more acute daily, they are not actively seeking new business. No relief in the supply situation is expected until the last quarter. Public works projects are making heavy demands.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 145

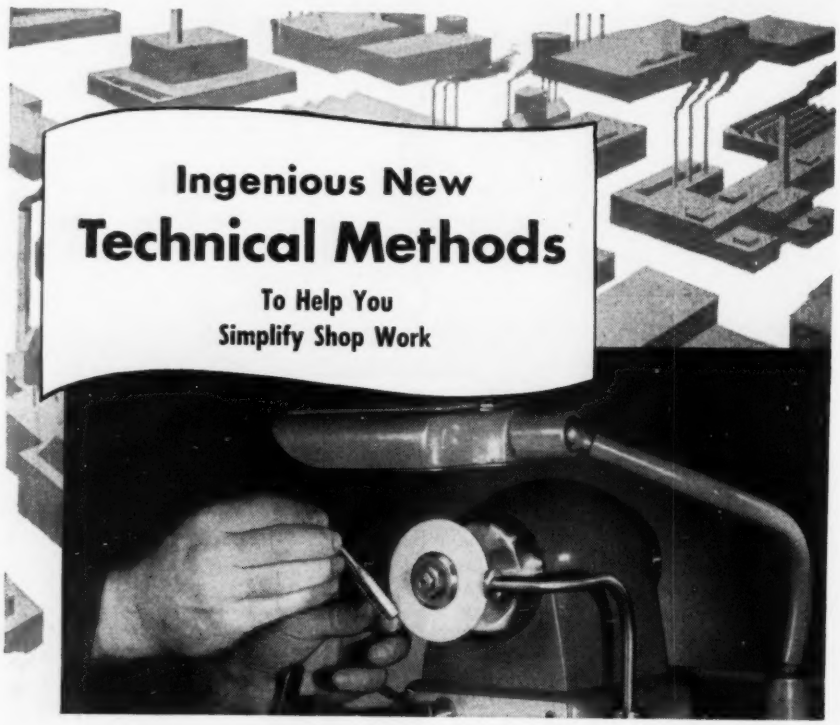
Cleveland — Recent interruptions to automobile production have been followed by a slight decline in demand from that field for bolts and nuts. However, demand from other quarters remains strong, especially from farm implement and tractor, road building equipment, power shovel and stationary diesel engine manufacturers.

Promptness of bolt and nut deliveries depends largely on availability of steel. Deliveries of production bolts generally can be made in about six weeks; specialties, in 10 to 18 weeks.

In view of the current high level of industrial production and the coming defense and foreign aid programs, outlook for bolt and nut business is bright. Although steel procurement has been difficult, bolt and nut producers will have just as good a year in 1948 as in 1947, it is predicted.

Bolt and nut prices generally are unchanged, although last week one producer reduced the discount on alloy studs from 49 per cent to 45 per cent.

Pittsburgh — Some fastener producers are catching up on order backlogs, notably in the larger size classifications. Reflecting this situation, warehouse stocks of standard items have been augmented in recent weeks. Some producers have not been able to make headway against order backlogs for cold punched nuts in the popular size ranges of 1/2 to 5/8 inch. Somewhat better delivery schedules are reported on large diameter bolts. Mill deliveries of cold heading wire have recorded little improvement, with result output of cold punched items have been adversely affected due to unbalanced inventories. New buying has settled down to more or less routine pattern in contrast to situation throughout most of last year when deliveries were extended 12 to 14 months.



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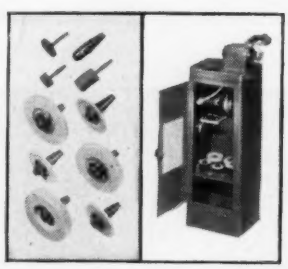

Grinding Wheels — Corlett-Turner Grinder

AC-65

Pig Iron . . .

Blast furnace silvery pig iron prices advance $4. Other grades may rise

Pig Iron Prices, Page 146

Cleveland—There was considerable speculation here last week as to whether recent scattered increases in pig iron prices would become general. Among the latest to announce price advances were Jackson Iron & Steel Co. and Globe Iron Co., both of Jackson, O. Each raised blast furnace silvery pig iron $4 a ton, making iron of 6.00 to 6.50 per cent silicon content $53.50 per ton f.o.b. Jackson. The Jackson Iron & Steel increase was effective June 3 and the Globe advance was effective June 7. Struthers Iron & Steel Co., Struthers, O., raised price of basic pig iron $3 a ton June 1, making the new price $42.50 f.o.b. Struthers.

New York — No improvement in pig iron supply is in sight and with a high ratio set aside for housing under voluntary allocation less merchant tonnage is likely. Production is hampered also by want of coke at some furnaces. Ratio of scrap in melts is high and some foreign iron is being purchased to bring up carbon. While the price is high, foundries are buying. Several units in the Buffalo area are out of blast or below capacity which limits tonnage from that territory.

Boston — As the first year of pig iron distribution by Mystic furnace under the mutual co-operative program draws to a close, surveys indicate shipments are remarkably near original quota delivery schedules. In a few instances consumers have taken in 100 or more tons over quotas but, on the whole, tonnage is within a few tons of promise. In a few instances, where quotas have been exceeded, a balance is being struck by lower deliveries this month. Considering the Everett furnace output has by circumstances been spread thin, there is a minimum of complaints. For an indefinite period, the Everett furnace output will be the bulwark of supply for foundry and malleable, but probably at higher prices after July 1. Vacations will cut down foundry melt next month, but no suspensions in iron shipments are likely to be asked.

Melters of basic are probably in a more precarious situation than gray iron and malleable foundries. Iron for two steel works is coming by rail from Buffalo, the price being tied to heavy melting steel scrap prices at that point. There has been some move toward resumption of water shipments to Phillipsdale and Bridgeport, but problem of accumulating tonnage for barges and inability of consumers to risk delays in the maintenance of operations is a deterring factor.

Cincinnati — Foundries are starting vacation shutdowns, but they are not relaxing pressure for pig iron. Hope of all is that steady shipments will, in combination with cut in the melt, enable the building of some stocks. Shipments generally are from old sources, but the district market

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is absorbing an occasional job lot of higher priced iron.

Chicago — Prospect of another coal mining stoppage after July 1 is not comforting to foundries, which already are suffering from lack of pig iron. Should mining cease, blast furnaces would be forced down in short order because of inadequate coal stocks. Shipments of iron are steady, but on a hand-to-mouth basis insofar as maintaining melts is concerned. Also disquieting is the fact that the government is seeking to earmark 100,000 tons of pig iron for the housing program. Of this district's 42 blast furnaces, 39 are operating. Youngstown Sheet & Tube Co. has scheduled its No. 4 furnace at South Chicago, idle since the coal strike, to resume June 12, but on the same date will blow out No. 1 at Indiana Harbor for replacement with a new and considerably larger unit.

Buffalo — Although merchant iron producers report no immediate plans to boost prices, talk persists that it is only a matter of time until such a move is made due to increased costs. Exorbitant prices being paid by foreign purchasers are exerting additional pressure on the market. One sale by a midstate seller was reported at above $100 a ton.

Malleable melters continue to run far short on supplies although an easier supply situation is noted among gray iron users. While some furnaces are running below peak tonnage levels, the area's blast furnace rate remains at 87½ per cent of capacity with only two idle units. Another stack, however, will probably be shut down shortly.

Birmingham — Recent price increases in pig iron apparently have made no difference whatsoever in the hue and cry for iron. Users find little solace in the fact that the district's capacity is not adequate to take care of requirements, but they recognize the fact that equitable distribution is being made.

Refractories . . .

Refractories Prices, Page 146

Pittsburgh — Refractory producers are planning to establish additional price bases soon and issue new classification of extras in compliance with June 26 deadline of FTC's order to cease and desist from a combination and conspiracy to fix prices and eliminate competition in the industry. How far-reaching these changes will be remains to be seen, although it is indicated such practices as "phantom freight" and "systematic pricing policy" in respect to meeting competition largely will be abandoned.

New demand continues very heavy throughout full range of refractory brick items. Relining programs for much overworked blast furnaces, coke ovens and open hearths show no indication of easing, while considerable volume of new orders also is represented in scheduled expansion of additional coke oven and open-hearth facilities. Deliveries are extended 6 months on super-duty clay brick and special shape silica bricks; most standard sizes are available within 3 weeks. Sellers have made little inroads into order backlogs in recent weeks, a situation that hasn't been made easier by continued freight car shortage.

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Scrap . . .

Scrap Prices, Page 150

Pittsburgh — Scrap shipments to mills have fallen off, forcing some interests to slightly reduce inventories for the first time since April. While significant large tonnage purchases have not been reported recently, mills are buying steadily in small lots. One producer has considerable tonnage outstanding on old orders. Formula prices plus maximum springboard of $2.50 a ton prevail on nearly all shipments with possibility of occasional small tonnage from remote points. Dealers and brokers are resisting mill efforts to obtain lower price levels. Mills' scrap inventories are in relatively good shape, a situation which has encouraged greater insistence on quality of scrap meeting specifications. Supply of railroad scrap has improved, with prices holding at previous quotations. High cast scrap prices have resulted in somewhat better supply for these grades, although quality of material is below standard.

Boston — Cast scrap has softened on light buying in this district with several consumers refusing to pay within $2 of recent top prices. Outside buying, however, has tended to maintain a firm tone until recently. More heavy melting steel scrap is offered and buying is moderate at formula prices. Only few small mills are willing to go over that figure. Users of steel scrap complain of off-quality and are tightening up on inspection.

Buffalo — Having completed old contracts, scrap dealers have accepted new orders for approximately 10,000 tons at the formula price of $39.75 a ton for steelmaking grades. Dealers are able to do business at whatever tonnage they desire at the standing formula bids of leading mills. The market for No. 1 heavy melting is quiet as the top consumer of this item has a fair inventory on hand as a result of a recent furnace shutdown. Dealers are passing off good quality No. 1 material in low phos orders. A substantial quantity of low phos was reported moving out of the area at $43 a ton f.o.b. Buffalo. Low phos is selling at $44.75 to $45.25. While a slightly softer tone is noted in cast scrap, prices are holding at $60 to $62 a ton for mixed material; a limited supply of No. 1 cupola was quoted at $64 to $65. The cast market eased as foundries were hit by insufficient supplies of coke and pig iron.

Cleveland — Improved mill inventories of scrap continue to make buyers more selective, with a result demand has narrowed for open hearth grades. However, electric furnace scrap is in good demand because of current high production of alloy steels. A moderate decline in the scrap flow was noted last week, possibly reflecting reduced shipments of steel to consumers and the lower rate of automobile production. Foundrymen continue to show some resistance to high prices of cast grades, but are limited in this respect by difficulty of procuring sufficient pig iron to offset some of the needs for scrap. Prices remain unchanged.

Chicago — Movement of scrap is in good volume and prices are generally steady. Formula prices are

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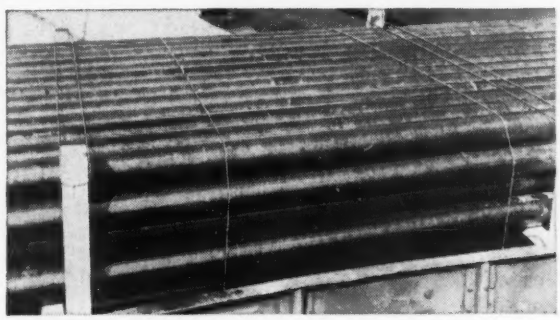

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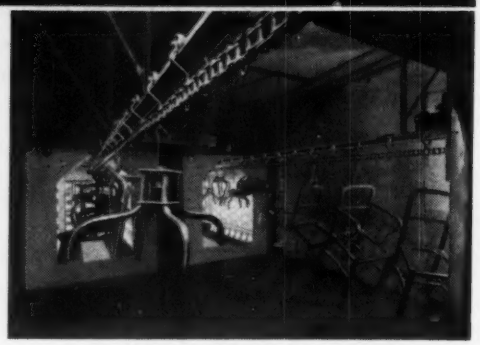

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being observed on open-hearth material, with No. 1 heavy melting steel at $39.50 a ton delivered and other grades accordingly. A slight easing is noted in cast iron material, although prices range in a $5 bracket. Some grades of railroad material are stronger pricewise, but most items hold at level of the past several weeks. Scrap is being melted at a high rate, with the result that mills are unable to make notable headway in inventory building.

Cincinnati—Scrap is moving steadily at a stable price level and a number of melters have expanded stocks. Price is easier, especially in cast scrap, with the approach of vacation shutdowns being one factor and the threat of extended coal miners' holidays being another. Some market interests, however, contend that heavy requirements for the high steelmaking rate mean that the basic trend in scrap is bullish.

Birmingham—Scrap prices are holding steady here. Material has come into the open in fairly steady volume with heavy melting price tone stronger.

St. Louis — Scrap prices are unchanged to stronger, with most brokers predicting an increase soon. Country scrap is not moving well due to farmers' work in the fields and the prospect is that source will remain slow a month or two. The July and August drop-off normally is substantial. The strengthening Chicago market has not been reflected here but is anticipated shortly. Scrap demand is picking up, especially in foundry grades. Until two weeks ago, when big foundries apparently reached the adequate reserves simultaneously, it was soft. But now there is evidence of minor scramble to hedge against a coal strike and consequent pig scarcity. Generally speaking, mills are in the best condition for scrap since the end of the war. One big consumer last week bought 10,000 tons of heavy melting steel. There is no steel production letdown and, if scrap shipments should fall considerably, the scrap pile story would change over night.

Seattle — Although Oregon dealers have been unable to ship scrap to Seattle for ten days, due to flood conditions, receipts here are steady and equal to consumption. The price is firm and unchanged. As soon as transportation facilities are restored, mills hope to increase inventories noticeably. Bethlehem's Seattle plant has accumulated an inventory of ingots as open-hearth furnaces continued while the mill was closed for repairs.

Rails, Cars . . .

Track Material Prices, Page 145

New York — Domestic freight cars delivered during May totaled 9192, the sixth consecutive month that production has been maintained above 9000 and making the average for that period 9130, the American Railway Car Institute announced last week. Of May deliveries, 6651 were from the car builders and 2541 were built in railroad shops. Of the total deliveries, 4416 were hoppers, 2625 box, 957 gondolas, 635 refrigerator and 545 tank cars.

New cars ordered during the month totaled 2222 cars; 1861 to the car builders and 361 to be built in rail-

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road shops. Cars on order as of May 31 totaled 127,681.

Seattle — William Smith Co., Los Angeles, has been awarded a $996,433 contract for replacing rails on the Alaska Railroad between Anchorage and Fairbanks, 47 miles of track or 94 miles of rail. New 115-lb rail purchased from Columbia Steel Co., will replace 70-pound rail. Previous major contracts for the Alaska Railroad terminal project went to Morrison-Knudsen Co. and M. P. Butler, Seattle.

Philadelphia — India plans to place an order for 100 locomotives, costing $12 million, with Baldwin Locomotive Works here, according to the India Supply Mission, Washington. The locomotives are described as broad gage, new type and streamlined. Another order, consisting of 100 locomotives and costing $13 million has been placed in Canada, 60 going to Canadian Locomotive Co. and 40 to Montreal Locomotive Works Ltd.

Warehouse . . .

Warehouse Prices, Page 147

Boston — The fog is gradually clearing in the warehouse price structure, although attended with confusion. Warehouse prices for most steel products are higher, despite some mill reductions last month: freight wiped out most reductions while suppliers in some instances made no price revisions. Numerous items are up $1 to $2 a ton at the warehouse level. Demand for most standard carbon prducts is far in excess of supply and, with third quarter allocations reduced, distributors are in no position to fill all requirements over the next few months; structurals, flat-rolled, plates and pipe are in short supply.

Pittsburgh — With exception of cold-rolled strip and carbon plates, there is a price range of 5 to 15 cents per hundred pounds on the various steel products handled by steel distributors in this area. This situation is expected to prevail as long as variation in mill product quotations persist. Distributors' inventories continue unbalanced despite strict distribution control through allocation. Some increase in demand is noted in cold-finished and alloy bars, apparently reflecting extended mill delivery promises.

Cleveland — Anticipating demands from national defense programs, one warehouse here has for the first time stocked aircraft quality alloy steel bars. They consist of alloy 4130 cold-finished rounds 3/8-in. to 5 in. and alloy 4140 hot-rolled rounds 1/2-in. to 6 in. Warehouses report their mill receipts of steel have shrunk somewhat but that demand shows no sign of weakening.

Cincinnati — Mill shipments to warehouses have been lighter recently. Jobbers' third quarter quotas show decreases in contrast with original second quarter allotments. Minor adjustments in prices, for varying reasons, are still being made.

Chicago — Already unable to serve their customers satisfactorily because of short and unbalanced inventories, steel warehouses view third quarter with much apprehension. Starting in July, they will suffer cuts in quotas as a consequence of the coal strike. Demand for steel will inten-

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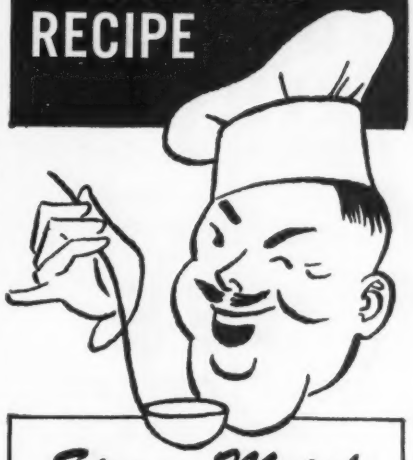

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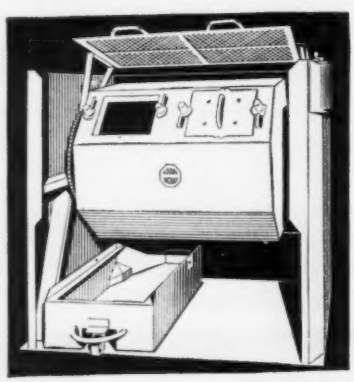

ROTO FINISH

THE STURGIS PRODUCTS CO.
891 Jacob Street
Sturgis, Michigan

sify because consumers turn to distributors to make up tonnage which they are unable to get directly from the mill. Currently, all types of steel are sought, but the most critical shortages are in flat-rolled products, carbon and alloy bars, light structural shapes and plates.

St. Louis — Demand for warehouse steel continues unabated. Inventories are low and warehousemen are worried at the prospect they will get 5 to 10 per cent less tonnage the third quarter than the second. Receipts are down and virtually all items move out as fast as they arrive. Mill allocations to warehouses have been tightening in all items and some distributors feel they are being squeezed tighter than big consumers who buy at the mills. Demand on warehouses for hot-rolled bars, plates, structurals and sheets is especially strong. The only easiness noted is in stainless and alloy steel. Distributors claim they are in the worst state of uncertainty since the war. Most of them cut prices in line with the mills, later being forced to add the freight rate boost. They complain their profit spread is declining. Others, however, didn't make the cuts, hence considerable variation exists in warehouse prices in this district. Meanwhile, they don't know how to appraise or anticipate the effects of the voluntary allocations program, the rearmament program or the railroad and farm equipment programs. Moreover demand is fluctuating sharply from month to month. Cold carbon bars, for example, for a time were easy, with deliveries possible in 50 to 60 days. But the situation tightened almost overnight and now warehouses are promising from 3 to 4 months.

Seattle — The forced shutdown of Bethlehem's Seattle plant for repairs has aggravated the critical situation on a number of steeel items, plates and reinforcing bars particularly. Reopening of the mill was scheduled for last week. Jobbing houses report no easing of supply and no improvements in sheets is expected until next year. The volume of business continues steady, all items being in strong demand. Stocks are badly broken; inventories, low.

Canada . . .

Toronto, Ont.—D. S. Wood of the Tariff Department, Canadian Manufacturers Association, said recently that, despite the shortage of flat-rolled steel and wire nails, Canadian mills produced in the first quarter at an annual rate of 650,000 tons of flat-rolled steel while imports were only slightly less than half of this figure. Therefore, Canada is consuming flat-rolled steel alone at the rate of about 1 million tons a year.

Production of cold-rolled sheets will be augmented by tonnage from the Steel Co. of Canada Ltd.'s new mill, probably in the fourth quarter. However any tonnage produced from this mill can only be made available by depriving their hot-rolled sheet mills, and possibly bar mills, of tonnage which these mills are presently consuming.

Based on the first quarter's rate, 1948 production should aggregate 1,570,000 kegs of wire nails compared with 1,156,000 kegs in 1938. Furthermore in the latter year there were substantial exports of nails which are prohibited now. Nail production is being increased further, but this will be at the expense of wire rods needed for other wire products. Nails are being delivered by the mills to government-approved projects on a priority basis and to others on a quota basis.

Mr. Wood pointed out that steel production is as high as can be expected.

A directive will be made effective soon, if not already in force, whereby a certain quantity of pig iron previously used for steelmaking is to be made available to the foundries. If the pig iron lost to the steel mills is not compensated for by an equivalent quantity of scrap, Mr. Wood said, it is obvious that there must be a proportionate decline in overall production of rolling mill products.

An important percentage of Canadian requirements is covered by imported steel. United States mills, which export to Canada, are doing everything within their power to maintain deliveries, he said. Imports during the war and since have been more than double the prewar average tonnage. Nevertheless, demand for steel from the United States is far above the available supply, particularly flat-rolled steel, and "we can see no immediate prospect of that supply being increased," he said. United States mill deliveries in the third quarter will be lower than deliveries in the first and second quarters, due to the considerable tonnage which was irretrievably lost because of the coal strike.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

6350 tons, transmission towers, Virginia and Indiana, American Gas & Electric Co., to American Bridge Co., Pittsburgh.

1000 tons, new building, Meredith Publishing Co., Des Moines, Iowa, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

550 tons, seven beam span bridges, state of Vermont; six bridges, involving 470 tons, to Vermont Structural Steel Co., Burlington; and one bridge, 80 tons, to Bethlehem Steel Co.

270 tons, bridge, Sec. 59-F, Grass Lake, Ill., for State Highway Division, to American Bridge Co., Pittsburgh.

325 tons, Jewish Center, Buffalo, to the Bethlehem Steel Co.; Shirley-Herman Co. Inc., Buffalo, general contractor.

177 tons, Parker Davis dam, Earp, Calif., for Bureau of Reclamation, to Allison Steel Mfg. Co., Phoenix, Ariz.

150 tons, state bridge, Braintree, Mass., to Bethlehem Steel Co.; Henry Worthington, general contractor.

110 tons, community center building, Rockville Center, N. Y., to Grand Iron Works, New York.

Unstated, malt storage building, all steel, 32 x 94 feet, Vancouver Breweries Ltd., Vancouver, B. C., to unstated interest; $175,000 project; general contract to Smith Bros. & Wilson, Vancouver.

Unstated tonnage, spillway bridge, lifting beams and trash racks, Corps of Engineers, Galveston, Texas, to Virginia Bridge Co., Roanoke, Va., $126,190.

STRUCTURAL STEEL PENDING

8500 tons, first section express highway, East Boston, Mass.; bids June 22, State Department of Public Works.

2700 tons, power house, Indiana-Michigan Power Co., Lawrenceburg, Ind.; bids May 28.

1775 tons, terminal, Greyhound Bus Lines,

Chicago; bids May 25.

1750 tons, Seward-Portage highway, Alaska; bids to Public Roads Administration, Portland, Oreg., June 29.

475 tons, Central School, Newfane, N. Y.; John W. Cowper Co., Buffalo, low bid.

375 tons, vertical lift span and roadway approaches, bridge, Maurice river, Route 49, Millville, N. J.; bids June 24, Trenton; work also requires 40 tons, machinery, 3150 square feet open grading steel flooring and 33 tons, reinforcing bars.

300 tons, bus terminal, Chicago Transit Authority, Chicago; W. E. O'Neil Construction Co., Chicago, low on general contract; bids May 20.

223 tons, bridge, Sec. 0707.1 GF, Cook county, Ill., for State Highway Division; Bethlehem Steel Co., low on bids May 28.

200 tons, bridge, Sec. 06.2 HF, Cook county, Ill., for State Highway Division; Bethlehem Steel Co., low on bids May 28.

200 tons, Enterprise department store, Portland, Me.; F. W. Cunningham Co., Portland, general contractor.

153 tons, bridge, Sec. 32R-F, Woodford county, Ill., for State Highway Division; Bethlehem Steel Co., low on bids May 28.

150 tons, state highway bridge, North Adams, Mass.; W. W. Wyman Co., Pittsfield, Mass., general contractor.

135 tons, building, Sears, Roebuck & Co., Appleton, Wis.

100 tons, state highway bridge, Rutland, Vt.; bids in.

100 tons, shapes and bars, WF beam bridge, 162 feet, Rockingham, Vt.; bids June 17, Montpelier.

100 tons, roof framing, crane girders and rails, Colorado-Big Thompson project, Bureau of Reclamation, Denver; Virginia Bridge Co., Roanoke, Va., low.

Unstated tonnage, radial gates, Frenchman-Cambridge unit, Missouri Basin project, Bureau of Reclamation, Denver; American Bridge Co., Pittsburgh, low, $298,068, f.o.b. shipping point.

Unstated, McNary dam, Columbia river; bids to U. S. Engineer, Portland, Oreg., June 25.

Unstated, aerial tramway, Mt. Hood, Oreg.; also unstated tonnage of steel wire cable; general contracts to Pointer-Willamette Co., Portland, and John A. Roebling Sons Co.

Unstated, two 290-ton traveling cranes for Hungry Horse, No. 2270; bids to Bureau of Reclamation, Denver, July 20.

Unstated, galvanized, for towers 110-kv transmission line, Tacoma light department; estimated at $1,476,000; bids to Tacoma, June 21.

REINFORCING BARS . . .

REINFORCING BARS PLACED

600 tons, research and development laboratory, Portland Cement Association, Skokie, Ill., to Inland Steel Co.; Turner Construction Co., Chicago, contractor.

345 tons, grandstand, Exhibition Gardens, Peoria, Ill., for city; divided 115 tons each to Inland Steel Co., Carnegie-Illinois Steel Corp., and Republic Steel Co.; V. Jobst & Sons, Peoria, contractor.

REINFORCING BARS PENDING

17,000 tons plus, Soap Lake siphon, Columbia Basin project; bids to Bureau of Reclamation, Denver, about June 25.

2850 tons, lining and structures, Columbia Basin project; bids to Bureau of Reclamation, Denver, late June; call out about June 11.

1640 tons, first section, express highway, including two multiple span steel viaducts with ramps, East Boston, Mass.; bids June 22, State Department of Public Works, Boston.

1575 tons, spillway and appurtenant works, Dam "B", Neches river project, Texas; bids June 29, District Engineer, Galveston; work also takes 46,660 square feet, steel sheet piling.

750 tons, Seward-Portland highway, Alaska;

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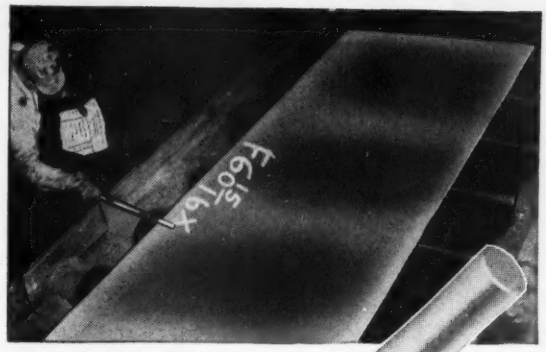

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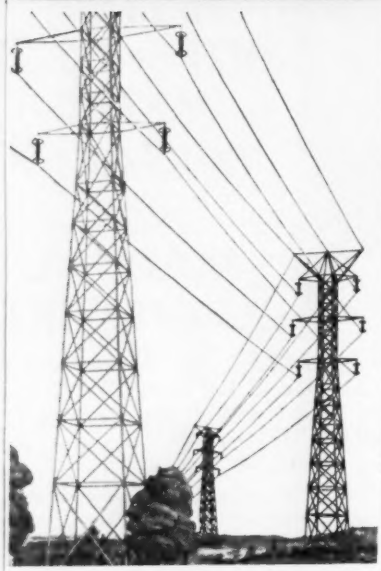

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hot-dip GALVANIZING

bids to Public Roads Administration, Portland, June 29.

375 tons, corps of engineers, Memphis district, Inv. 161; bids June 15; also 150 tons, structural steel inv. 162.

275 tons, state highway project, Clifton, N. J.; bids June 24, Trenton.

250 tons, manufacturing building, Goodman Mfg. Co., Chicago; Sumner S. Sollitt & Co., Chicago, contractor; bids May 12.

180 tons, Schoitz Memorial hospital, Waterloo, Iowa; bids June 7.

165 tons, state highway projects, Old Saybrook and Old Lyme, Conn.; bids June 21, Hartford.

150 tons, state highway projects, including bridges at Rockingham and Rutland, Vt.

100 tons, Washington state highway bridge, Mason country; general contract to S. S. Mullen, Seattle, low $25,025.

100 tons, irrigation canal, Klamath project, Oregon; No. R 1-16; bids to Bureau of Reclamation, Denver, June 30.

Unstated tonnage, Bureau of Reclamation, Sacramento, Calif., to Bethlehem Pacific Coast Steel Corp., San Francisco, $108,185.67 f.o.b. Bethany, Calif.

PLATES . . .

PLATES PLACED

210 tons, stacks and miscellaneous, Sanitary District of Chicago., Chicago, to Independent Boiler & Tank Co., that city.

Unstated tonnage, steel penstocks, Davis dam, Calif., Bureau of Reclamation project, to Southwest Welding & Mfg. Co., Alhambra, Calif., $935,000.

PLATES PENDING

14,000 tons, Soap Lake siphon Columbia Basin project; bids to Bureau of Reclamation, Denver, about June 25.

Unstated tonnage, 250,000-gallon elevated steel water storage tank, naval supply depot, Spokane, Wash.; bids in.

PIPE . . .

CAST IRON PIPE PLACED

263 tons, 8 to 4 inch, for Bremerton, Wash., to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

STEEL PIPE PENDING

200 tons, central school, Newfane, N. Y.; John W. Cowper Co., Buffalo, low bid.

Unstated, 16,000 feet 8 inch for Payette division, Boise project, Idaho; bids to Bureau of Reclamation, Denver, about June 25.

RAILS, CARS . . .

LOCOMOTIVES PLACED

McCloud River, one 1500-horsepower diesel-electric switcher, to Baldwin Locomotive Works, Philadelphia.

Minneapolis, Northfield & Southern, five 2000-horsepower diesel-electric transfer locomotives, to Baldwin Locomotive Works, Philadelphia.

Missouri Pacific, five switching locomotives, to Baldwin Locomotive Works. Philadelphia.

St. Louis, Brownsville & Mexico, 10 diese-electric switchers, to Baldwin Locomotive Works. Philadelphia.

RAILROAD CARS PLACED

New York Central, 30 multiple-unit commuter cars, 130-pasenger, to St. Louis Car Co.

RAILROAD CARS PENDING

Chicago & North Western, 25 covered hoppers, 70-ton capacity.

Clinchfield, 500 hoppers, 50-ton capacity.
Gulf, Mobile & Ohio, 500 hoppers, 50-ton capacity, and 500 gondolas, 50-ton capacity.
Norfolk & Western, 1000 hoppers, 70-ton capacity.

Western Maryland, 200 gondolas, 50-ton capacity; 200 box, 50-ton capacity; and 50 mill-type gondolas, 70-ton capacity.

CONSTRUCTION AND ENTERPRISE

CALIFORNIA

RICHMOND, CALIF.—Gar Wood Industries Inc. has started production of dump truck bodies here. Production of other products will begin as soon as possible.

SAN LEANDRO, CALIF.—Special Equipment Co., 512 Alic St., Oakland, will build a $150,000 factory for the manufacture of glass.

CONNECTICUT

BRIDGEPORT, CONN.—Buckley Bros. Inc., J. J. Buckley, president, 1 Seaview Ave., has abandoned a $500,000 oil storage and processing project.

HARTFORD, CONN.—Hartford Electric Light Co., 266 Pearl St., has awarded a $6 to $7 million contract to Stone & Webster Engineering Corp., 49 Federal St., Boston, for construction of a power plant.

DELAWARE

WILMINGTON, DEL.—E. I. duPont de Nemours & Co. plans to construct ten laboratory and semi-works buildings at a cost of $30 million.

FLORIDA

BARTOW, FLA. — Davison Chemical Corp. plans an addition to its phosphate recovery facilities near here, to cost over $500,000.

MIAMI, FLA.—Miami Roofing & Sheet Metal Corp., 550 N. W. Seventh St., has awarded a $94,000 contract to Gaines Construction Co., 537 S. W. 12th Ave., for a warehouse and shop.

TAMPA, FLA.—Tampa Ship Repair & Drydock Co., c/o H. M. Shepard, plans reconditioning graving dock ard two basins at the Hookers Point shipyard.

IDAHO

BLISS, IDAHO—Idaho Power Co., 1220 Idaho St., has awarded a $11,500,000 contract to Morrison-Knudsen Co. Inc., 319 Broadway, Boise, for construction of a hydroelectric plant on the Snake River.

IOWA

MASON CITY, IOWA—E. M. Duesenberg, Clear Lake, has awarded a $70,000 contract to Henkel Construction Co., 525 Ninth St. S.E., for erection of a factory.

NEBRASKA

LINCOLN, NEBR.—Loup River Public Power Distributor, P. E. Hampton, chief engineer, Columbus, plans a $150,000 power generating station, including a building, equipment, etc.

NEW JERSEY

NUTLEY, N. J.—Queens Ribbon & Carbon Co., 742 Wyth Ave., Brooklyn, N. Y., will build a $100,000 factory.

RARITAN TWP., N. J.—Paraffine Cos. Inc., 295 Fifth Ave., New York, will build a $3 million plant and warehouse here.

OHIO

HAMILTON, O.—Hamilton Autographic Register Co. has awarded a $100,000 contract to A Benzing & Sons, 209 S. Ninth St. E., for construction of a factory.

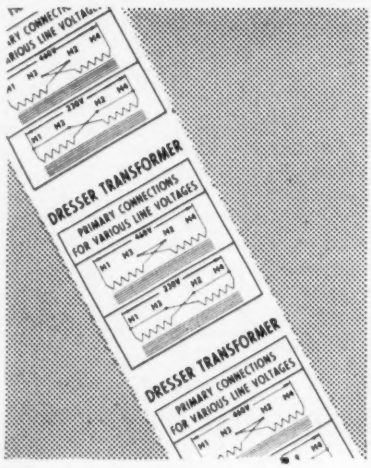
PENNSYLVANIA

BRISTOL, PA.—Minnesota Mining & Mfg. Co., 900 Fauquier Ave., St. Paul, has awarded a $1 million contract to Turner Construction Co., 1500 Walnut St., Philadelphia, for erection of alterations and additions to the old Fleetwings Plant No. 2.

EASTON, PA.—Lehigh Portland Cement Co., 718 Hamilton St., Allentown, has awarded a $100,000 contract to E. C. Machin Co. Inc., 1024 N. Quebec St., Allentown, for construction of a plant addition.

GRATERSFORD, PA.—Quaker Brick & Tile

ASSEMBLY LINE FOLLOW THROUGH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For years, industrial physicians and safety engineers have recommended salt tablets as low-cost insurance against the loss of efficiency and man-hours that "heat fatigue" causes. But it is vitally important that workers **accept** the salt tablets you provide them—are sure they are pure, reliable, safe.

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Undoubtedly most of your employees use Morton's Table Salt in their homes. They know it is dependable and pure. So they accept Morton's Salt Tablets. They know they are a wholesome health aid backed by a familiar name.

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"Heat Fatigue" costs money!

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Modern Plastic Dispenser. Practical, accurate, large size. 1000 tablet capacity.....$3.25

Heavy Duty Dispenser. Strong metal for rough treatment. Accurate. 500 tablet capacity.....$4.00

Morton's Salt Tablets Case of 6000, 10-grain, plain salt tablets....$2.10
Case of 6000 8-grain Salt Dextrose Tablets. $2.60

Co., 1321 Queen St., Pottstown, plans to build a $100,000 plant here.

HARMARVILLE, PA.—Gulf Research & Development Co., 435 Seventh Ave., Pittsburgh, plans to build a $1,500,000 laboratory here.

MC KEESPORT, PA.—National Tube Co. will build a 4-story office, sintering plant and bin building at a cost of $1 million. Firm will undertake also to make repairs on a pipe mill and coupling building, at a cost of $200,000.

PITTSBURGH—Graybar Electric Co. Inc., 37 Water St., will build a $500,000 distributing plant and office on N. Lincoln Ave.

PITTSBURGH—Link Belt Co., 2125 Koppers Bldg., will build a warehouse costing $194,700 on Center Ave.

YORK, PA.—Reliance Mfg. Co. Inc., Hay and Ridge Sts., has awarded a $250,000 contract to I. Reindollar & Son, 35 N. George St., for construction of a factory and office.

TENNESSEE

COPPERHILL, TENN.—Tennessee Copper Co. plans to build a $400,000 mill addition.

MEMPHIS, TENN. — International Harvester Co., 180 N. Michigan Ave., Chicago, plans to build a $1 million parts depot and warehouse here.

MEMPHIS, TENN.—W. T. Raleigh Co., c/o Anker F. Jansen & Associates, architects, Columbian Mutual Tower Bldg., will build a $250,000 warehouse and office.

NASHVILLE, TENN.—Dempster Bros. Inc., c/o Russell W. Strand, has awarded a contract to Harlan Construction Co. for erection of an addition to its road machinery building at Foster Ave. and Murfreesboro Rd.

TEXAS

BISHOP, TEX.—Celanese Corp. of America has awarded a $145,000 contract to Arthur Bros., Kingsville, for construction of a mechanical shop, locker rooms and an outdoor yard for heavy equipment.

BORGER, TEX.—Phillips Petroleum Co., Bartlesville, Okla., will build an $8,500,000 gasoline plant here.

CHOCOLATE BAYOU, TEX.—Phillips Petroleum Co., City National Bank Bldg., Houston, will build a $4,500,000 gasoline plant here.

CONROE, TEX.—Humble Oil & Refining Co., 1216 Main St., Houston, plans to build a gasoline and high protane recovery unit here at a cost of $5,735,000.

DALLAS, TEX.—Texcrete Co., 4703 Ross St., plans to build a $70,000 plant.

FORT WORTH, TEX.—Cook Paint & Varnish Co., Fifth and Throckmorton Sts., plans to build a $175,000 warehouse.

HOUSTON, TEX.—Link Belt Co. has awarded a $500,000 contract to Vivrett & Vivrett, Southland Life Bldg. Annex, Dallas, for a 2-story plant and office, 5100 S. Wayside Dr.

MC KINNEY, TEX.—Texas Textile Mills will reconstruct portions of its textile mill at a cost of $750,000.

MERCEDES, TEX. — Trans-Continental Gas Pipeline Co., Longview, plans natural gas pipeline from point in Rogers Lacy field near here through Louisiana, Mississippi, Alabama, Georgia, North and South Carolina, Virginia, Maryland, Pennsylvania, New Jersey and New York, terminating on east bank of Hudson river at 132nd St., New York. Cost is estimated at $151 to $180 million.

PICKTON, TEX.—Humble Oil & Refining Co., 1216 Main St., Houston, plans to build a natural gasoline plant here costing $2,135,000.

UTAH

HELPER, UTAH — Denver, Rio Grande & Western Railroad plans an $850,000 expansion program, most of the construction to consist of installation of new rail on a section near here.

SUNNYSIDE, UTAH — Kaiser-Frazer Corp., Willow Run, Mich., has awarded a contract to Anderson & Sons, Price, and Nielson & Sons, Huntington, for construction of a road betwen the company's coal tipple here and the new track hopper at the rebuilt coke ovens in southeastern Utah.

WISCONSIN

KENOSHA, WIS.—American Brass Co., 1420 63rd St., has awarded a $165,000 contract to Austin Co., 510 N. Dearborn St., Chicago, for the design and construction required in remodeling a factory.

CANADA

WINNIPEG, MAN.—Empire Brass Mfg. Co. Ltd., 74 Princess St., has awarded a $90,000 contract to Conture & Toupin, Montreal Trust Bldg., for construction of a warehouse and office.

NIAGARA FALLS, ONT.—Lionite Abrasives Ltd., L. J. Brazzinet, manager, plans to build a $300,000 plant unit.

OTTAWA, ONT.—Canada Cement Co. Ltd., Hull, has awarded a $500,000 contract to Doran Construction Co. Ltd., 5 Concord St., for erection of a crushed stone plant five miles east of here.

PRICES OF LEADING FERROALLOYS PRODUCTS

(*Concluded from Page* 147)

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Eastern Zone, contract, carload, bulk, 8.7c per lb of briquet, c.l. packaged 9.5c, ton lot 10.3c, less ton 11.2c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Eastern Zone, contract, c.l. bulk 8.75c per lb of briquet, c.l. packed 9.55c, ton lot 10.35c, less ton 11.25c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Eastern Zone, contract, carload, bulk 5.1c per lb of briquet, c.l. packed 5.25c, ton lot 6.7c, less ton 7.6c. **(Small size**—weighing approx. 2½ lb and containing exactly 1 lb of Si). Eastern Zone, carload, bulk 5.25c c.l. packed 6.05c, ton lots 6.85c, less ton 7.75c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.45c for c.l. and 0.9c for l.c.l. Freight allowed. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Eastern Zone, contract, carload, lump, bulk 17.50c per lb of alloy, carload packed 19.0c, ton lot 19.8c, less ton 20.8c; Central, add 0.5c for c.l. and 0.85c for l.c.l.: Western, add 2.55c for c.l. and 2.6c for l.c.l. Freight allowed. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Eastern Zone, contract, carload, lump, bulk 16.25c per lb of alloy, carload packed 16.45c, ton lot 19.35c, less ton 20.85c; Central, add 0.5c for c.l. and 0.75c for l.c.l.; Western, add 2.55c for c.l. and 2.90c for l.c.l. Freight allowed. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 50-55%, Si 8% max., C 3% max.). Eastern Zone, contract, any quantity, $2.90 per lb of contained Va; Central, add 2c for c.l. and 3c for l.c.l.; Western, add 6c for c.l. and 9c for l.c.l. Freight allowed. Spot, add 10c. **Special Grade** (Va 50-55%, Si 4% max., C 1% max.), $3. **High Speed Grade** (Va 50-55%, Si 1.50% max., C .20% max.), $3.10.

Vanadium Oxide: All Zones, contract, less carload lots, $1.20 per lb of contained V_2O_5. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TITANIUM ALLOYS

Ferrotitanium: (Ti 20-25%, Al 3% max., Si 4% max., C 0.10% max.). Eastern Zone, contract, ton lot, 2" x D, $1.35 per lb of contained Ti, less ton $1.40. (Ti 40-45%, Al 7% max., Si 4% max., C 0.10% max.). Ton lot $1.23, less ton $1.25; Central, add 4c for 20-25% Ti grade, and 2.1c for 40-45% grade; Western, add 13.5c for 20-25% Ti grade, and 7.2c for 40-45% grade. Freight allowed. Spot, add 5c.

Ferrotitanium, High-Carbon: (15-20%). Contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Eastern Zone, contract, 10,000 lb W or more, $2.25 per lb of contained W; 200 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Eastern Zone, contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Eastern Zone, contract, c.l., lump, bulk 6c per lb of alloy, c.l. packed 6.75c, ton lot 7.5c, less ton 8.35c; Central, add 0.25c for c.l. and 1.1c for l.c.l.; Western, add 0.6c for c.l. and 3.95c for l.c.l. Freight allowed. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Eastern Zone, contract, carload, lump, packed 18.4c per lb of alloy, ton lot 19.15c, less ton 20.40c; Central, add 0.6c for c.l. and 1.05c for l.c.l.; Western add 3.05c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Eastern Zone contract, 100 lb or more, 1" x D, $1.20 per lb of alloy, freight allowed. Less than 100 lb $1.30; Central, add 0.75c; Western add 2.9c, freight allowed. Spot, add 5c.

Borosil: (3 to 4% B, 40 to 45% Si), $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Eastern Zone, contract, ton lot, 2" x D, $2.50 per lb of contained Cb, less ton $2.55; Central, add 1.65c; Western, add 6.45c. Freight allowed. Spot, add 10c.

CMSZ Mixes: No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Eastern Zone, carload, 12 M x D, carload packed 17.25c per lb of material, ton lot 18.00c, less ton 19.25c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l., and 3.05c for l.c.l. Freight allowed.

Silcaz Alloy: (Si 35-40%, Ca 9-11%; Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Eastern Zone, carload, packed, 1" x D, 39c per lb of alloy, ton lot 41c, less ton 43c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Eastern Zone, contract, carload, packed, ½" x 12 M, 15.0c per lb of alloy, ton lot 15.75c, less ton 17.0c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed. Spot, add 0.25c.

Simanal: (Approx. 20% each Si, Mn, Al). Packed, lump, carload 10c, ton lots 10.25c, smaller lots 10.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus: (17-19% based on 18% P content with unitage of $3 for each 1% of P above or below the base) Gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferromolybdenum: (55-75%). Per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.